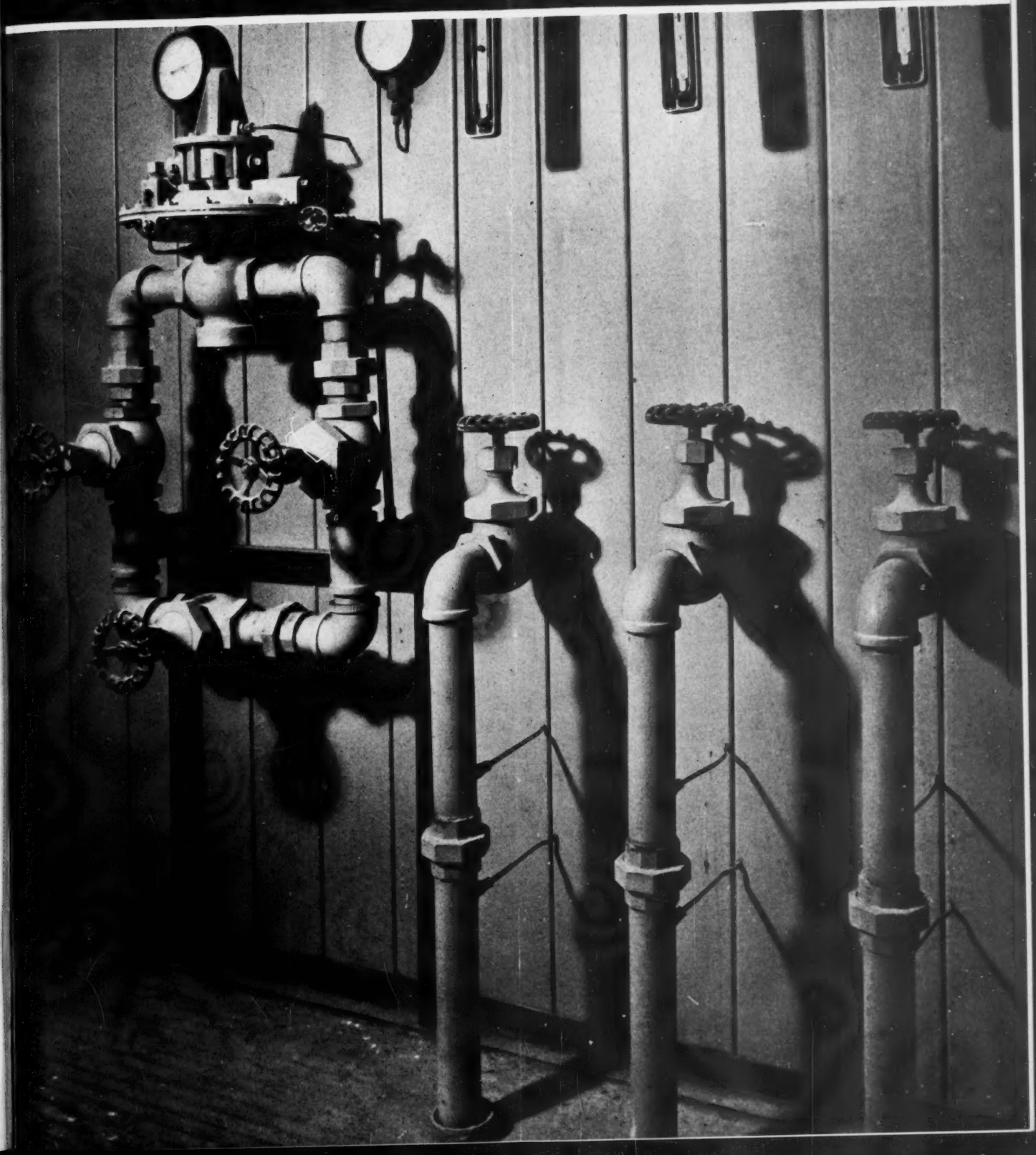
Industrial

August 1946

Standardization



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Some 2000 Industrial concerns hold membership either directly or by group arrangement through their respective trade associations

Readers Write

Dr Moss Champions Abbreviations Without Periods

General Electric Company

Gentlemen: In this democratic country Dr Chilton [see letter in INDUSTRIAL STANDARDIZATION, July, 1946] has a right to his desire for periods after abbreviations, but it may be that he is swimming against the tide. The American Standard Abbreviations are coming into more and more use as time goes on and the difficulties that Dr Chilton fears don't seem to be happening.

Dr Chilton gives the impression that the American Standard definitely specifies such things as psf, imep, and similar abbreviations. The American Standard does permit such abbreviations, and they are coming into general use by 'consent of the governed', which is the way the Declaration of Independence says things ought to happen. But the American Standard also includes such abbreviations as lb per sq in. and ft per sec. The omission of periods in such cases is not objectionable to the many people who follow this Standard. This is sufficient justification for the practice and ought to satisfy Dr Chilton. Some of us feel quite confident that the practice is going to spread. The ASA Committee on Omitting Periods is composed of intelligent men who knew just what they were doing and whose Standard is meeting with acceptance.

SANFORD A. MOSS
Consulting Engineer

School Lighting Standard Used in Brazil

Pela Revista Politécnica
São Paulo, Brasil

Gentlemen: We hereby come to thank you for the kind permission given us for the translation of "American Practice of School Lighting". The above publication has aroused great interest among the students of São Paulo's Polytechnic School (Brasil), so we wish to add the gratefulness of all our fellow students.

ELIAS CORREA DE CAMARGO
Director

Sound Measurement Tests Based on American Standard

National Association of Fan Manufacturers

Gentlemen: This Association will follow with interest the work of your group [ASA Sectional Committee on Acoustical Measurements and Terminology, Z24] because our present code on sound measurement tests for centrifugal and axial fans is based on definitions, standards, and specifications of the American Standards Association.

L. O. MONROE
Secretary

Color Code Helps Train Personnel for Safety

The Atlantic Refining Company
Philadelphia, Pa.

Gentlemen: For many years we have used a color code that follows to the letter the American Standards Association Safety Color Code, Z53, as recently published in the new pamphlet. Our experience has been that it has made the training of our personnel much easier, and we feel that it has also substantially reduced the number of accidents that could be expected from employees who work in the processing areas, either on operation or maintenance.

A. E. BACCINI
Technical Consultant

Standard Colors Identify Contents of Pipe Lines

Colorado Fuel and Iron Corporation
Pueblo, Colorado

Gentlemen: We are beginning to use standard colors in paint for safety in our mill, and we have run into the problem of determining the colors to be used on pipe lines carrying gas, water, air, steam, etc. Do you have any standards on the particular line of work?

A. H. ZEILINGER
Safety Engineer

• • The American Standards Association forwarded copies of the American Recommended Practice Scheme for the Identification of Piping Systems, A13-1928, and the American War Standard Safety Color Code for Marking Physical Hazards and the Identification of Certain Equipment, Z53.1-1945.

Lookout Oil & Refining Company
Chattanooga, Tennessee

Gentlemen: We are interested in designating the various product lines such as hydrogen gas, oxygen, steam, oils, and air in our plant through a color scheme. It is our understanding that you have a publication entitled "Recommended American Practice Scheme for the Identification of Piping Systems" (ASA A13-1928). We would appreciate your sending us this pamphlet.

C. L. HUNT

• • The ASA was pleased to forward a copy as requested.

Our Front Cover

New developments in the standardization of pipe threads are discussed in an article by A. M. Houser, page 199. Photo courtesy of Crane Company.

Industrial Standardization

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Contents

August, 1946 Ruth E. Mason, Editor 35 Cents

The American Standards Association is a federation of national groups dealing with standardization. Through it, government, industry, labor, and the consumer work together to develop mutually satisfactory national standards. It acts as the authoritative channel for international cooperation in standardization work.

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British Information Service

Why the British Ministry of Works is doing everything in its power to make available 400,000 new homes per year

Five years of enemy air bombardment left 4,500,000 British homes destroyed. This picture shows damage caused by a German V.2 rocket bomb in a raid on London in March 1945. Seventeen houses were completely or largely demolished in this explosion, 111 were seriously damaged, and another 1,500 homes received other damage. It can be seen clearly in this picture that roofs, where they exist, are nearly all simply tarpaulins thrown over to keep out the worst of the weather.

Britain Bids for Better Building

A brief review of British Building Standards for postwar use and some thoughts about the opportunities for United States development of postwar building standardization

By W. H. Deacy, Sr

AS early as 1941, the Ministry of Works of Great Britain encouraged the establishment of a series of committees to investigate and report on the major problems which were likely to affect peacetime building. The committees were so constituted as to ensure that their reports contained the considered views of experts and others closely concerned with the subject.

The wide destruction of all types of buildings, particularly houses, during World War II, presented a replacement problem which could only be solved by a meeting of the best and most experienced minds in the building industry. It was at once evident to the Ministry's building committees that old methods of construction would not fill the demand. Inter-war methods of production, which appeared promising, would have to be investigated and surveyed. Restrictive building codes would have to be relaxed under the powers of the Housing Acts and the Public Health Act. Entirely new constructions would have to be studied in comparison with older methods which had stood the test of time. Standard assemblies and sizes would have to be considered and developed to speed manufacture and construction and to make the most effective use of scarce materials. All of the committees have now reported on their findings and have recommended methods of accomplishing these objectives.

The Committee on House Construction, whose report is the first in the series, was appointed in 1942 and the report published in 1944. The proposed building program estimated the need for some 3½ to 4 million houses in the first ten years following the war. To supply these 400,000 homes per year it was obvious that labor must necessarily improve its productivity. Accordingly, to carry out the recommendations of the housing report, the British Ministry of Works is now seeking to apply standardization and mass production to housing. Bricks, doors, and windows are being made in fewer regulated types; the shells of entire houses are being cast in foam slag and aluminum; kitchens, bathrooms, and heating systems are highly standardized.

As a means of carrying out the Ministry's program, the British Standards Institution has already developed some 90-odd standards, and others are under way. In all these standards, care has been taken to follow the recommendations of the Committee Reports.[1] Nearly all of the recent standards received by the American Standards Association from the British Standards Institution show how close the tie-in is. This is to be expected, as in many cases the cooperating professional and other institutions connected with the building and civil engineering industries are identical. The same organizations very often prepared the Reports and also had representatives on the committee entrusted with the preparation of the standards. The net result is that the reports and standards combined are expected to give a complete coverage of each division of the building industry.

The British Standards at hand represent a wide section of the building industry and in some cases seem to cover the complete field of manufacturing involved. As an example we might take concrete. The titles of British Standards in this field will verify the statement as to range and extent.

1. Concrete interlocking roofing tiles
2. Pre-cast concrete flue blocks for gas fires and ventilation
3. Concrete plain roofing tiles and fittings
4. Pre-cast concrete blocks
5. Concrete flooring tiles and fittings
6. Sills and lintels (clayware, cast concrete, and natural stone)
7. Concrete aggregates and building sands
8. Cement finishes
9. Cast stone

It seems evident that the British, realizing the need for housing, have devoted a large percentage of their standardization effort to homes; although much has been done which has a bearing on other types of structures. As we glance over the standards we find some seven or eight deal with the standardization of various uses of wood such as doors, joinery, blocks for floors, surrounds, trim, windows, and stairs. Asbestos is standardized in regard to its use in slates and sheets, flue pipes and fittings, cement, rainwater pipes, gutters and gutter fittings. A selection at random among the files of British Standards shows such widely diversified products as glass blocks, wallpapers, roofing slates, steel fabric, asphalt, bricks, electrical appliances, adhesives, natural stone for building, and lime plastering.

As gas is very widely used in England there are ten or more standards covering the installation of gas supply and appliances. Among these we might mention:

1. Hot water supply by gas
2. Gas cooking installations
3. Gas-operated refrigerators
4. Installation of gas service pipes
5. Space heating by gas appliances
6. Gas metering and consumers control
7. Gas lighting single family dwellings

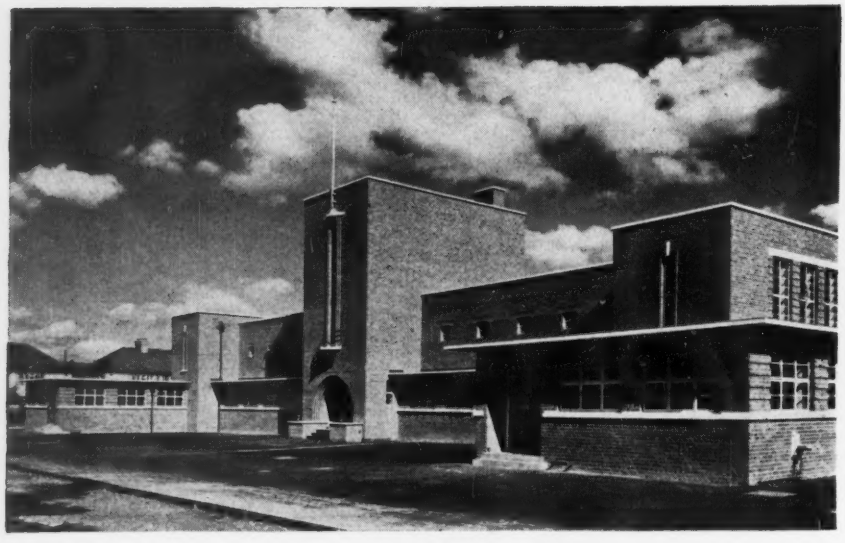
To show how a particular manufacturer or producer may find that

W. H. Deacy, Sr, *has had many years experience in the building field as a practicing architect in New York City. He is a member of the American Institute of Architects. Mr Deacy is now a member of the staff of the American Standards Association.*

[1] The chart on page 191 shows the number of standards that have been developed relating to each report.

Schools as well as homes are high on the list of urgent building being undertaken under the British Ministry of Works' postwar program. Modern British school design is exemplified in this elementary school near London. The principle of a central hall with separate classrooms opening from it is being generally followed in these new buildings.

British Information Service



the field or extent of a particular standard applies or relates to his product we can take British Standard Specification for Pre-Cast Concrete Partition Blocks 492 as a typical example. A foreword first explains with what the standard deals and calls attention to the difference in wet and dry strength, then follows a specification which concisely describes the cement and the aggregates. Following this, the specification continues with surface texture, manufacturing method, and dimensions. In the recommended sizes, tolerances are given for thickness, length, and height. A paragraph is then devoted to special sizes. Joints, curing, and sampling are described and specified. The transverse strength for solid blocks of standard thicknesses and heights is then given in table form. Compressive strength for hollow blocks is likewise given in a table. Finally, drying shrinkage and bulk density are specified. It would seem that all details of concern to a manufacturer or consumer are adequately covered.

The reports indicate that three specific groups are greatly benefited by the new British Standards—the architects, the manufacturer of building materials and equipment, and the contractors.

There is considerable indication that architects have in the past taken rather an indifferent attitude toward standardization. This may have been caused by a lack of knowledge and understanding of standardization. There were some who thought the application of standards impinged upon the architect's prerogative to create an original structure.

Today, this indifference appears to be banished and war has shown the necessity of standardization if we are to meet the demand for new structures with any degree of success. Indications are that the architect's creative ability has been stimulated rather than strangled by standardization requirements.

Specification writers in architects' offices have always been confronted with the necessity of drawing up specifications which completely describe and thoroughly cover the material or product contemplated for use in a given structure. To give such a complete description, a very lengthy and verbose document is evidently required. Unless the specification of a single manufacturer is copied verbatim—a dubious practice at best—a great amount of research is involved. Of course, here in the United States certain fundamental materials, such as cement, have been specified as to performance and quality by referring to the tests and quality established by the American Society for Testing Materials. Nevertheless, when the product required consists of an assembly, such as a lock, or a compound, such as paint, the writing of a binding specification becomes increasingly difficult. The British architect, it would appear, can now specify by simple reference to a British Standards Institution number.

The manufacturer or producer of building products is probably the one most benefited by the new postwar standards of the British Standards Institution.

Information at hand indicates that, when a building materials manufacturer states that his product conforms with BSI standards, he has immediately bettered his position in relation to a nonconforming competitor. The owner (consumer), the contractor, and the architect know at once that definite quality and performance are assured by any conforming product.

As an illustration of the value to manufacturer and consumer of a given standard, it appears fitting to mention British Standards 1203 and 1204:1945, Synthetic Resin Adhesives for Wood. In this standard, synthetic resin adhesives for plywood and cold-setting synthetic resin adhesives for construction work in wood are thoroughly covered. Definitions, sampling, testing, storage life, preparation for use, methods, veneers, and so forth are carefully standardized for plywood. Similar qualifications are set up for constructional work in wood.

We are informed that a standard along these same lines is very much needed in the United States where the use of plywood and glued structural wood forms and assemblies has become widespread during the war.

Contractors Benefited By Standard Materials

The third group specifically benefited is that of the contractors. First, this group is guaranteed a certain performance by the material or product if assured that it conforms with British Standards. It is interesting to note that the British Standards Institution has registered the words "British Standard" as a mark for use in connection with pipes and fittings conforming to its specifications. This mark (B.S.) may only be used under license from the Institution and on goods manufactured in Great Britain. As a contractor must necessarily give some over-all guarantee for his building, he must necessarily be relieved to be able to obtain materials and products that are in turn

guaranteed as to quality and performance. In a limited supply situation, a contractor is able to obtain materials and products from several sources knowing that their standardization makes interchangeability possible.

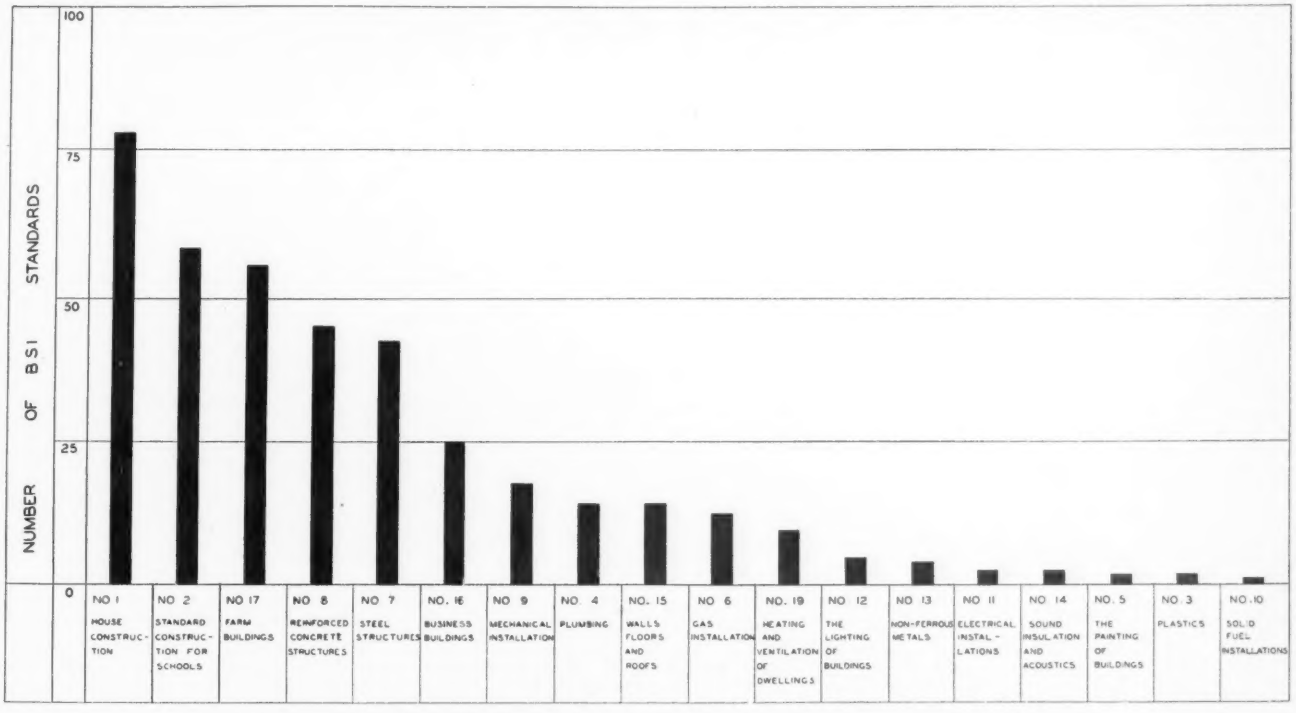
The remarkable feature about these British postwar building standards is the appeal and usable value they have for the ordinary citizen—the ultimate consumer. Today, because of the lull in building and enemy action during the war, every family in Britain is a potential home builder or renter. Likewise, because of the stoppage of nearly all home building during the war, the same condition prevails in the United States. The public, more than ever before, wants to know how it can have good homes, how these are constructed, and what are the latest and best tested materials and assemblies available.

In clear and simple words, with a minimum of technical nomenclature, these British Standards tell the layman what he can expect or demand in any particular structure or from any particular material or product. All this is done without detracting in any way from the statements on technical requirements and performance.

An excellent example of such a standard is British Standard 990, Metal Casement Windows and Casement Doors for Domestic Buildings. The specifications are fully but simply stated and cover all features that enter into the fabrication of the unit. Complete drawings showing sizes, handling, method of indicating ventilators, details for coupling, sections, lugs and fittings are included. An appendix to this standard gives a table of window glass sizes. It will be seen that by such a method of writing a standard its use is very much broadened and extended. A thousand users are served where a purely technical standard might only serve a limited number of technicians.

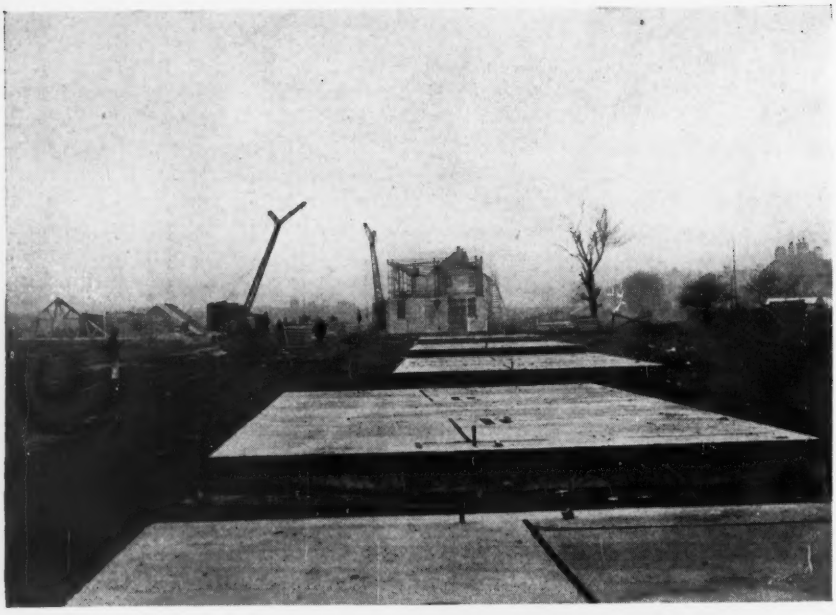
From comments received from England, it seems that this wider appeal of the British Standards to the general public was not deliberately incorporated or, if it was, little publicity has been given to it, as the public's demand for copies of the standards has not greatly increased. However, should similar standards be developed in the United States, a special publicity effort might well be made in order that the public might become aware of the usefulness of the standards.

The extent to which these standards may increase the sale of materials covered can best be judged by considering the process through which the average person at present makes his selection of building materials and equipment. The prospective home owner in the United States usually gives several years of thought and planning to his home before proceeding with the actual construction or purchase. During this period the family busily devours the popular magazines on building and decorating, and scouts the neighborhood and countryside to look at every new home under construction. A great mass of manufacturers' and producers' catalogs is assembled. Clippings and illustrations, mostly on the gadget side, are collected. By the time building actually gets under way, the architect, if one has been engaged, or the master builder, finds himself swamped with a mass of



How the British Building Standards Received by ASA Apply to the Ministry of Works Postwar Studies

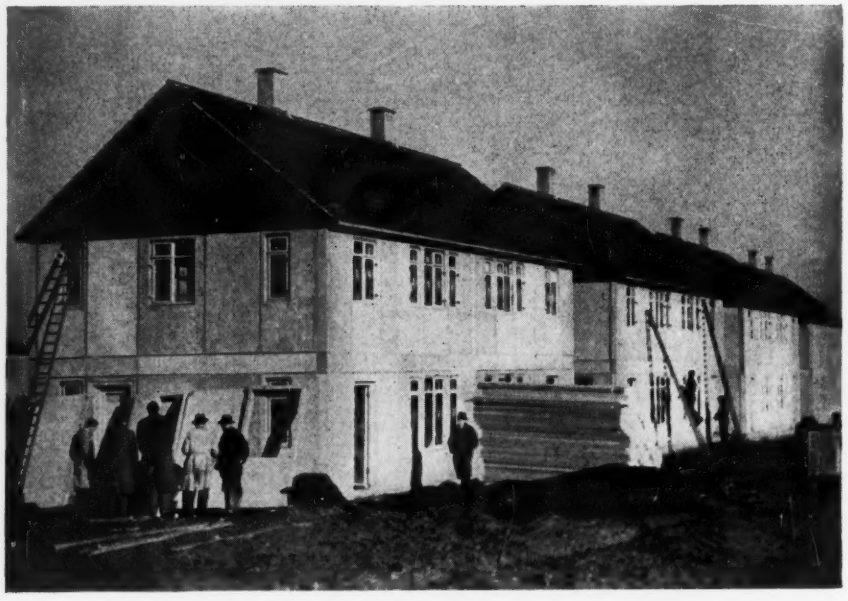
The numbers and titles above refer to the British Ministry of Works Postwar Building Studies. The black lines indicate the number of British Standards that apply to each report. One standard may have a bearing or relation to several reports as, for instance, British Standard 1191:1944, Gypsum and Anhydrite Building Plasters. This standard is related to or has a bearing on Report No. 1, House Construction; No. 2, Standard Construction for Schools; No. 17, Farm Buildings; No. 8, Reinforced Concrete Structures; No. 16, Business Buildings; and No. 15, Walls, Floors, and Roofs. The chart makes it evident that the greatest amount of standardization has been done on houses and schools.



Foundations for "Experimental Permanent Houses" that are being built under contract with the Ministry of Works by a firm that designed and built portions of the famous Mulberry Harbor for the invasion. For these experimental houses, a jig is built and slabs of concrete are placed around and cemented in position. The jig is then removed for use in building another house.

Photos—British Information Service

Here, the "Experimental Permanent Houses" contracted for by the British Ministry of Works and shown in early stages in the picture above are near completion. It is believed that use of this method will make it possible to build four houses per week.



more or less irrelevant literature and a conglomerate collection of unrelated ideas furnished by every member of the family.

The competent architect emerges from this avalanche of (mis)information and data with a creditable plan, and the building operation proceeds as smoothly as possible, but not before his skill and ability as a diplomat have been sorely tried.

The National Bureau of Standards in Washington has aided and does aid many prospective home builders by means of Letter Circulars which are most informative and useful, but these are not standards. The United States Department of Agriculture publishes several booklets and pamphlets devoted to the proper construction of farm buildings and structures. The Federal Housing Administration has established certain standard requirements mostly devoted to space and planning features. The American Institute of Architects has, through its various chapters, sponsored Small House Bureaus which enable home builders to obtain professionally prepared plans at a moderate cost. However, there is nothing available to the public that gives it an unbiased description of what it should expect from the various materials and installations that go into houses and homes. Is it looking too far into the future to visualize the time when the American home builder can obtain a complete set of standards which will cover the qualifications for his home, from foundation footings to finished roof.

Now let us get back to the British postwar standards on buildings and materials. These standards come in two series, British Standards and Codes of Good Practice. A typical example of a standard is the one on Wood Stairs with Close Strings — British Standard 585:1944. This is also a very useful type to the layman for it bears throughout the simplicity of expression which we mentioned before in this article. Within about a page of this standard we are told the fundamental rules for stairs, proportion of steps and pitch, width and length of flights, how winders should be arranged, headroom, and height of hand rail. After this information is given, the technical description of the construction follows, together with the necessary specifications. Even this part of the standard is so clearly and simply stated that it is understood by all and its use not restricted to the architect and builder alone.

Codes of Practice are particularly useful to the layman. Such usefulness is exemplified by the British Standard Code of Practice CP 1946 —Painting, Staining and Varnishing Wood and Treatment with Preservatives. This code describes the design considerations of wooden windows and door frames, gates, and other joinery to be painted. The things to be avoided in design are outlined at some length. Staining—how, when, and why used—is fully discussed. The various types of stains are described and the qualities they possess

are called to the users' attention. In the same manner, wood preservatives for brush application, interior and exterior paints, enameling, and varnishing are treated in detail. While this standard gives the layman a complete picture of what to expect in the field of painting, it also gives him enough information, if he so wishes, so that he may himself produce a creditable job of painting.

If any criticism of the British Standards is in order, it might be suggested that for the benefit of the lay public there might be fewer cross references and references to other standards. The inclusion of such pertinent information as set forth in other standards would be preferable, but doubtless this was not done in order to save paper and for the sake of brevity.

There are doubtless many who believe that a standard is not the place to set forth complete consumers' information regarding the use of a material or product. Nevertheless, it is widely believed that there is a definite need for unbiased information and instructions in this country. Standards developed by cooperative effort of all groups concerned, as in the case of the British Building Standards, would be helpful in filling this need.

As an illustration, take the subject of roofing. The average American has little specific knowledge of the types of roofing available for his home. He may have a masonry house and wish to have a slate roof on it, but because somewhere he has heard that the weight of slate is excessive, requiring greatly increased framing, he discards the idea. As a matter of fact, his framing may be adequate to carry the increased load. It would obviously be helpful to him in making his decision if a roofing standard were available which listed and included the relative weights of roofing materials and included some information on the framing requirements. As an additional help to the prospective purchaser, the committee preparing the standard might also consider including the relative costs.

The British Standards do not give comparative costs, but the postwar Building Studies (Committee Reports) do cover this feature. For instance, the Report on Plastics gives a very complete table showing the relative cost of all sheet wall coverings. Because of the fluctuations in price, unavoidable in our present market, it would undoubtedly be impossible to give exact prices, but the committee might decide that the consumer is entitled to know whether a ⅛-inch plastic sheet costs one-half or two-thirds as much as a ¼-inch sheet. The committee might also decide that it would be advantageous if the prospective purchaser should also know the relative installation costs, because a cheaper material, from its very nature, often requires more expensive setting or placing methods than a more expensive material.

Harmony of Standard Sizes Stressed in Building Materials

Most of the British Standards covering manufactured or produced parts or assemblies used in building construction endeavor to reduce the number of acceptable sizes. This effort is on the side of economy and efficiency. It emphasizes the necessity of harmonizing the various parts through some modular system to attain the maximum economy and efficiency and assure that all the standard sizes will fit together with the least possible cutting and trimming. For some time the American Standards Association has had under development the coordination of dimensions of building materials and equipment in Project A62. Already, the coordinated sizes based on this work are being applied in a number of building fields—steel sash, wood windows, glass, and masonry units. Should any extensive development of standards in the building industry be attempted in the United States, whether along the lines of the British postwar standards or along very different lines, this modular system of dimensioning would undoubtedly have to be carefully weighed and considered as a means of coordination of sizes in the preparation of every standard.

At the last annual meeting of the Chamber of Commerce of the United States, Mr E. P. Palmer made a statement which may well be mentioned. He stated that an important factor for maintaining an active market for the services of the building industry, in common with all industry, is the progressive reduction of costs. Much has been done and is being done in this direction by the manufacturers of construction materials and of all mechanical equipment used in construction operations, he explained. It is a fact, however, he said, that with a few exceptions, the research development of one type of unit has proceeded independently from that of other types. Without doubt, he declared, there is an opportunity for better coordination of thought and exchange of ideas, and an increasing need for an effective means of keeping all in the industry informed as to the technical advance in the art.

The development of standards in the building industry might well be an agency for accomplishing the very things to which Mr Palmer refers. Innumerable new constructions and assemblies are coming out in the building field at the present time. Most of these are designed to effect economies and greater efficiency in use. However, because they have been developed independently of each other and often without proper consideration of existing forms of construction, the installation costs have been found so high that they defeat the very purpose for which they were designed. It might be argued that various manufacturers would hesitate to divulge their new product pending its arrival on the market and that after its arrival would be too late to make any changes required by standardization. In some cases, this might be true but most producers are likely to find that the lack of certain types of standardizing defeats the success of their product. Witness the action recently taken in a field closely related to building, in fact a contributing industry—the electric lamp industry.

The large manufacturers of electric bulbs have in recent months produced many unusual and special lamps for various purposes, such as health lamps, violet ray lamps, heat bulbs, insect-repellent bulbs, and so forth. It was soon discovered that the lack of standardization in the shape and form of these bulbs or lamps was reacting unfavorably in sales. Result was the undertaking by the ASA of a standardization project requested by the big lamp manufacturers.

The British experience with the postwar building standards raises the question of whether a similar program in the United States would tend to increase productivity. Mr E. P. Palmer declares: "In increased productivity only can the welfare of the worker be promoted. Increased investment in the job has always brought greater productivity. It is the construction industry's job in the next few years to convert investment dollars into useable facilities."

Can standardization in the building industry do its share?

Brigadier General Armstrong Is New Member of ASA Staff

Will apply broad experience and knowledge of standardization problems to help in expanding and strengthening cooperation between American Standards Association and industry

THE work now underway to broaden the scope of the American Standards Association will receive strong support when Brigadier General Donald Armstrong, whose prospective retirement from the Army after thirty-six years' service was recently announced, joins the staff of the American Standards Association August 1. General Armstrong will assist Howard Coonley, chairman of the ASA Executive Committee, in expanding and developing the activities of the ASA. He will also help Mr Coonley in arranging for an adequate budget to enable ASA to fulfill the enlarged responsibilities which the Policy Committee on Standards, under the chairmanship of Charles E. Wilson, agreed with Secretary of Commerce Henry Wallace that the ASA should undertake. (INDUSTRIAL STANDARDIZATION, April, 1946, page 65.)

General Armstrong's experience in the Ordnance Department as Chief of Maintenance, Office Chief of Ordnance, as Executive Officer and Chief of the Chicago Ordnance District, and as Commanding General of the Ordnance Replacement Training Center at Aberdeen, Maryland, gives him an exceptionally fine background for the American Standards Association. From 1924 to 1926, General Armstrong was on duty in the testing laboratory at Watertown Arsenal on Ordnance research and development. In his Ordnance work he became keenly aware of the importance of standards and of the savings in time and material that the use of standard specifications made possible. As Commandant of the Industrial College of the Armed Forces he has helped to emphasize the importance and value of standardization for an effective and less costly industrial mobilization. He has an exceptionally wide acquaintance among executives of industry and commerce in the United States, particularly in the Middle West where he met many of the important industrial leaders during his service as Chief of the Chicago Ordnance District.

General Donald Armstrong

Although General Armstrong has spent his entire career in the Army, his interests include many other fields as well. He was graduated from Columbia University with an A.M. degree in 1909, and is known as an eminent Latin scholar. For several years (1937 through 1939), he served as professorial lecturer in the Classics Department of George Washington University. He specialized in higher mathematics until he now qualifies as an expert mathematician. He is the only American graduate of the Ordnance course of the French Army.

His Army career started in 1910 when he became second lieutenant in the Coast Artillery Corps. In 1918 he served on the staff of the Chief of Artillery, AEF, in France. In November of that year, General (then Major) Armstrong made a report on the German fortifications on the Belgian coast. He also studied and reported on the defenses of Heligoland. The five years following the end of World War I he spent in France, first with the Direction de l'Artillerie of the French Army, then as assistant military attache at the American Embassy at Paris. He became student officer at the Centre d'Etudes Tactiques d'Artillerie, Metz, in June 1920 and at the French Coast Artillery School at Toulon in May 1921. In 1923 he transferred to the Ordnance Department. He was assigned to the Planning Branch in the office of the Assistant Secretary of War in 1927, and in 1935 became chief of the Maintenance Division in the office of the Chief of Ordnance. He was Executive Officer and Chief of the Chicago Ordnance District from July 1939 to 1942, the year he was promoted to brigadier general. Following a short period as chief of the Tank Automotive Center at Detroit, General Armstrong was made commanding general of the Ordnance Replacement Training Center at Aberdeen, Maryland, where he has served from January 1943 to September 1944. His last service has been as Commandant of the Industrial College of the Armed Forces where one of his activities was the organization of industry advisory committees to the College. These committees have contributed much to a better understanding and cooperation between the industries represented and the Armed Forces.

The broad range of General Armstrong's interests is indicated in the fact that he is a member of the American Association for the Advancement of Science, the New York Historical Society, the American Sociological Society, the Newcomen Society, and is a fellow of the Royal Society of Arts. He is also president of the American Military Institute and of the District of Columbia Post, Army Ordnance Association.

On the occasion of his retirement from the Army he was given a dinner by the 80 student officers of the Army and Navy in the class graduating on June 27 and by the staff and faculty of the Departments of Instruction and Research of the College. At this dinner attended by many distinguished guests, including Mr Donald of NEMA, Dr Tower, Iron and Steel Institute, and Messrs Mack and MacLeod of the Treasury Department, Frederick R. Lack, vice president of ASA, formally announced that General Armstrong would join the American Standards Association about August 1, 1946.

The Honorable Kenneth C. Royall, Under Secretary of War, in an address at the graduation exercises of the Industrial College of the Armed Forces at Washington on June 27, stated:

"I cannot close these remarks

without paying tribute to the distinguished service rendered by General Donald Armstrong, the retiring Commandant of the College. Under his command, the Industrial College has achieved a pre-eminence among military and civilian institutions of learning that is extremely gratifying.

"General Armstrong, you are completing a long and distinguished career of service to your country, and have erected a living monument by your superior administration of an establishment which discharges a duty of the gravest responsibility in the scheme of our national security."

General Armstrong in 1945 was awarded two Legions of Merit by the War and Navy Departments, respectively, for service in World War II. Columbia University presented him with a "University Medal for Excellence" at the recent commencement exercises. This award is presented "annually to graduates or members of the University for achievement in public service".

Dr Moss Receives Howard N. Potts Medal

The Howard N. Potts Gold Medal was presented to Dr Sanford A. Moss at the annual Medal Day ceremonies of the Franklin Institute "in consideration of the extreme value of his work in making a turbosupercharger a successful and reliable part of an internal combustion engine."

Dr Moss started his work on the now famous turbosupercharger during World War I, when he was one of those requested by the National Advisory Committee for Aeronautics to help solve the problem of achieving greater power in military planes.

Although the turbosupercharger was developed just too late for service in the first World War, continued research in the years that followed brought it to such a high state of development that it contributed largely to the excellence of allied aircraft in World War II.

At present a consulting engineer for the General Electric Company, Dr Moss recently has been devoting attention to systems for automatic control of airplane power plants equipped with superchargers, so that pilots can concentrate on fighting. He has been active for many years in the ASA work on standardization of symbols and abbreviations and is now vice chairman of the sectional committee on that subject.

Illuminating Engineering Society Awards Medal to Crittenden

THE IES Medal, given by the Illuminating Engineering Society in recognition of "meritorious achievement which has conspicuously furthered the profession, art, or knowledge of illuminating engineering" has been awarded to E. C. Crittenden, assistant director of the National Bureau of Standards, who after 25 years has just retired as chief of the Bureau's Electrical Division. Mr Crittenden is chairman of the Standards Council and a member of the Board of Directors of the American Standards Association. He is also president of the United States National Committee of the International Electrotechnical Commission.

E. C. Crittenden

The IES Medal, highest honor in the field of lighting, will be presented to Mr Crittenden, together with an official citation, at the Illuminating Engineering Society Convention to be held September 18-20 at the Chateau Frontenac, Quebec, Canada.

Probably the most outstanding of Mr Crittenden's many notable achievements in illuminating engineering, the Society explains, are his contributions in developing and establishing acceptable standards and units for the measurement of light. He started his work in this field about the time that the International Candle, founded on the performance of a group of carbon filament incandescent lamps, was adopted as a unit of light measurement by Great Britain, France, and the United States, on the initiative of this country. He assumed a leading role in the efforts to overcome the shortcomings of that unit, and devoted many years to the complicated work involved in the development of the New Candle, based upon a reproducible primary standard, making suitable evaluations for variations in color of light, and adjusted to the needs of newer illuminants.

Mr Crittenden's work resulted in the approval of the New Candle by the International Commission on Illumination and the International Committee on Weights and Measures which was established by treaty between the leading nations. The unit was adopted by the International Committee in 1937 and by the ICI at its sessions in Holland in 1939. Plans were made for its universal adoption in 1940. Despite the interruption of World War II, this is still the most promising proposal for world-wide agreement on a unit of light measurement, as soon as normalcy permits, the IES declared. This new unit promises to halt the annoying discrepancies which have been encountered between measurements in different laboratories, the Society announces, especially those in different countries, and to provide for practicable measurements of light of wider variation in color. Accurate interchange of data between countries will now be possible.

Personnel Changes in Division of Electricity

F. B. Silsbee is the new chief of the Division of Electricity, National Bureau of Standards. E. C. Crittenden, chief of the Division for 25 years, is now devoting his entire time to his duties as Assistant Director of the Bureau. Charles Moon has taken over from H. L. Curtis the duties of chief of the Inductance and Capacitance Section; and F. M. Defandorf has become chief of the Instruments Section. Chester Snow has been detached from the Inductance and Capacitance Section and assigned as mathematical consultant to the chief of the Division.

Texas Court Upholds Use of Fire Protection Standards

Decides that state legislature has the constitutional right to authorize a state commission to apply standards of the NFPA

NOTE: The present widespread interest in the legality of standards makes this article, reprinted from the National Fire Protection Association Quarterly, Vol 39, No. 4, of special importance at this time.

A CASE which has important bearing on several phases of the application of NFPA [National Fire Protection Association] and other similar standards used as a basis for law was recently passed on by the Supreme Court of Texas. The majority opinion of the court, handed down on March 20, 1946, upheld the reasonableness of the adoption of such standards by reference. It further supported the idea, without saying in so many words, that fictitious considerations of fire hazard should not be invoked to secure results that might be quite properly obtained by clear-cut zoning laws. Zoning laws exclude certain business operations from residential areas because the particular business may be obviously undesirable for a variety of reasons, only one of which may be the fire hazard involved.

The case in question required the Texas Court to affirm or reject the findings of a court of civil appeals. This appellate court refused to support an injunction to prevent the erection, in a suburb of Greenville, Texas, of two tanks at a bulk station for the storage of butane gas.

A group of owners of residences, the nearest approximately 128 feet from the proposed tanks, asked that the tanks be declared a nuisance because of the fire hazard involved. The court's majority opinion declared that the nuisance angle could not be substantiated because the installation obviously conformed to the limitations of the NFPA Standards on Liquefied Petroleum Gas as promulgated by the National Board of Fire Underwriters' Pamphlet No. 58.

The majority opinion also upheld the adoption of the NFPA National Board Standards by reference and made a strong statement of the case for such adoption by reference. This is of interest because there has been a trend of court decisions in Texas in support of the contrary view which was argued by three of the justices, who filed a dissenting opinion to that of the other six.

The majority opinion established that there was no unconstitutional delegation of legislative authority in the course adopted by the state legislature of authorizing the Railroad Commission of Texas to adopt the NFPA National Board Standards on Liquefied Petroleum Gases. This decision is the more significant because the minority justices argued, with a good deal of merit, that the wording by means of which the adoption was effected, was faulty. There could be no objection, they reasoned, to the formal adoption of the NFPA standards by due process which would include formal action on the regulations by the Texas legislature and publication in full. The most valid criticism offered to the wording under which the rules were adopted was that the Texas Railroad Commission was given authority only to adopt a specific standard. They could have had no basis for reasoning that there was a tinge of unconstitutionality in the adoption of these standards if the law had simply empowered the Railroad Commission to exercise its own judgment in deciding what standards to adopt.

However, the support of the majority opinion for the idea of adopting any reasonable and generally accepted standard (such as the NFPA National Board standards) is important because it shows that the court is not too much impressed by the mere detail of wording of the law. The reasonableness of the legislature's intent is accepted.

The NFPA Standards on Liquefied Petroleum Gases specify minimum distances between tanks for liquefied petroleum gases and the nearest important buildings or group of buildings. The tanks in question were 8400 gallons and 10,000 gallons respectively. For these, the minimum distance in the standards adopted by the Railroad Commission of Texas is 50 feet, with the additional provision that the Railroad Commission act as inspection department having jurisdiction to specifically approve the location of larger sizes. This, the majority opinion held, defined the factor of location with respect to other buildings satisfactorily for the purpose of coping with any fire hazard or nuisance from hazards involved. The Railroad Commission had definitely approved the location. The minority justices attacked the fact that the Railroad Commission apparently did not specifically approve the location until the action for an injunction was threatened.

The dissenting justices belabored the factor of location. The location could have been attacked and it is quite likely that a case could have been made for the fact that a business occupancy of this sort might be an undesirable addition to a residential district. The petitioners could not get the majority of justices to agree, however, in the light of compliance with a reasonable set of safety standards, that the business constituted an unreasonable fire hazard.

We have seen many cases of this general sort where the petitioners might have been successful in excluding a business occupancy from a residential district if it had been attacked on a broad basis with the same considerations that are employed to establish zoning requirements. Members of the NFPA staff, for example, on numerous occasions have been requested to testify as to the fire hazard of proposed installations of gasoline tanks at bulk storage stations and similar locations. Usually those soliciting such aid have wanted to establish the fire hazard as the reason for the exclusion of the tanks in question from the location in point. However, there are other considerations. Gasoline or butane, for example, contribute to the convenience and comfort of a community and are necessary for transportation, heat, and power.

Furthermore, by observing accepted standards such as those of the NFPA, the fire hazard can be kept within reasonable limits so far as the public safety is concerned. It is encouraging to note that the majority justices of the Texas Supreme Court were not misled, and their decision will be generally supported by fire protection authorities.

The case in question was that of R. G. Dudding *et ux. v.* Automatic Gas Company, and the decision of the Texas Supreme Court was dated

March 20, 1946. We are indebted to Mr Eugene Sanders, Fire Prevention Chief of the State Fire Marshal's Office in Texas, for procuring for us a verbatim transcript of the majority and minority opinions. These are contained in the Texas Supreme Court Reporter, March 23, 1946 (Volume 15, No. 26, pages 245-253). The following extracts from the majority decision include the points of particular interest to NFPA members.

Extracts from Majority Decision

The case is before this Court solely on the question of the propriety of issuing an injunction to restrain the proposed construction of respondent's tanks.

In their argument petitioners affirm that "there is only one matter involved in this case and that is as to the location of the 20,000 gallon butane gas tanks, and whether located as they were, they constitute a nuisance."

Location of Tanks Considered

It is not disputed that the respondent is engaged in a lawful business and has fully complied with all applicable rules and statutes, except only it is urged that the regulatory powers contained in the act from which we will presently quote do not extend to an approval of the location of respondent's tanks. Accordingly, our inquiry narrows to a consideration of the regulations which assume to permit the location of these tanks within certain minimum distances from adjoining and near-by property.

In 1939 the Legislature passed a comprehensive regulatory statute to prevent the improper handling and use of liquefied petroleum gases, which enactment included the following:

"After the effective date of this Act all containers and pertinent equipment installed for use in this State for the storage and dispensing of liquefied petroleum gases for the purpose of providing gas for industrial, commercial, and domestic uses, shall be designed, constructed, equipped, and installed as specified under the published regulations of the National Board of Fire Underwriters for the design, installation and construction of containers and pertinent equipment for the storage and handling of liquefied petroleum gases as recommended by the National Fire Protection Association, effective July, 1937, a copy of said regulations known as National Board of Fire Underwriters Pamphlet No. 58 being on file with the Gas Utilities Division of the Railroad Commission of Texas." Sec. 2a, Art. 6053, as amended Acts 1939, 46th Leg., p. 501 (Sec. 2-a, Art. 6053a, Vernon's Rev. Tex. Stat.)

Pamphlet No. 58, adverted to in the act, includes the following regulation:

"B.5 Location of Containers and Regulating Valves.

(a) * * * Except as herein provided, each individual container shall be located with respect to nearest important building or group of buildings or line of adjoining property which may be built upon in accordance with the following table:

MINIMUM DISTANCE

Water Capacity per Container	*Underground*	*Aboveground*
Less than 125 gallons...	10 feet	None
125 to 500 gallons.....	10 feet	10 feet
500 to 1200 gallons.....	25 feet	25 feet
Over 1200 gallons.....	50 feet	50 feet

Aboveground containers of capacity exceeding those shown in the above table may be installed close to buildings or property lines when specifically approved by the inspection department having jurisdiction."

The Railroad Commission of Texas was designated as the agency to administer this act. It promulgated rules which substantially conform to the statutory standards. These rules include a provision that the particular containers which respondent proposes to erect "shall be located and installed in accordance with specific approval obtained from the Railroad Commission of Texas." This approval was obtained. Moreover, the tanks were located substantially farther than the minimum of fifty feet from near-by structures, which as we have seen was expressly approved as a criterion by the Legislature itself. Manifestly, one of the many factors which concerned the lawmakers in enacting this statute was the location and spacing of tanks for the storage of butane gas, and by its adoption of this pamphlet the Legislature effectively laid down definite standards as to spacing. The respondent has fully complied with these standards as well as with the rules of the Railroad Commission.

It was entirely proper for the Legislature to adopt, for the guidance of the Railroad Commission in administering the act, standards theretofore prescribed by the National Board of Fire Underwriters. Nor is the statute invalid because the standards thus adopted were not copied into the act but were incorporated into it by reference to a document then on file with the administering agency. Ex parte Gerino, 143 Cal. 412, 77 Pac. 166, 66 L. R. A. 249; State of Washington v. Bonham, 93 Wash. 489, 181 Pac. 377, L. R. A. 1917D, p. 996; Gima v. Hudson Coal Co., 106 Pa. Super. 289, 161 Atl. 903, affirmed 310 Pa. 480, 165 Atl. 850. The very first article of our Revised Statutes adopts by reference the common law of England and we apprehend that none would question its validity. Interestingly in point is an observation of the Supreme Court of Georgia in Central of Georgia Railway Co. v. State, 104 Ga. 831, 31 S. E. 531, where the court was considering the validity of an adoption act putting into effect a recodification of the statute laws of Georgia. The point had been urged that the measure was invalid because the new code was not copied at length into the act adopting it, and hence offended against the constitutional provision requiring that before final passage bills should be read in each house of the Legislature on three several days. After calling attention to Georgia's statutory adoption by reference of (1) the common law of England, (2) the equity jurisprudence in force in that country, and (3) the American experience table of mortality, the court observed:

"Similar instances might be multiplied to such an extent as to show that a tremendous breach, if not a total wreckage, of our system of laws, would be accomplished if the judicial construction contended for in this case were placed upon the constitutional provision above quoted."

Also illustrative of the constitutional power of a state legislature to enact such a measure as is here under consideration, we quote the following from L. A. Thompson Scenic Railway Company v. McCabe, 211 Mich. 133, 178 N. W. 662, in which the Supreme Court of Michigan made a distinction between the scope of the legislative powers of the City Council of Detroit and those of the Michigan Legislature:

"Reliance is placed by the defendant upon Act No. 174 of the Public Acts of 1917, by means of which it is said, the State Legislature adopted the 'Boiler Code of the American Society of Mechanical Engineers' by reference only. The propriety of this method of legislation has never been questioned, so far as we are advised; but, assuming its entire constitutionality, it should be borne in mind that the Legislature of the state functions under broad constitutional limitations, whereas the common council of the city of Detroit must act strictly within the powers granted to it in the charter."

The adoption of the regulations in question is not open to such an objection as was urged in State v. Crawford, 104 Kan. 141, 177 Pac. 360, 2 A. L. R. 880, a criminal case where a statute adopting present as well as prospective rules of an unofficial association as a standard of conduct, departure from which would be punished as a crime, was held

invalid. It is true that the 1939 enactment also authorized (but did not require) the Railroad Commission of Texas "to adopt and promulgate such rules and regulations as may be hereinafter adopted and published by the National Board of Fire Underwriters and/or the National Fire Protective Association" for the handling of liquefied petroleum gases. But the matter of adopting future rules is not in this case. What we are now considering is the validity of that set of rules which was adopted by the lawmakers when they gave legislative sanction to Pamphlet No. 58 from which we have quoted. We do not have before us a situation where future rules of an unofficial agency have been prospectively adopted by the Legislature or the Railroad Commission. To the contrary, we have here a document containing comprehensive regulations for the safe handling of liquefied petroleum gases which was on file among the archives of the Railroad Commission, and which the statute expressly approved. The adoption of these rules in this manner was certainly a valid exercise of legislative power.

It follows from what has been said that the installations which respondent proposes to construct have been effectively legalized, and accordingly their erection could not have been abated as a nuisance. The applicable rule is well put in 39 Am. Jur., p. 478. We quote:

"Generally, the courts will not hold conduct to constitute a nuisance where authority therefor exists by virtue of legislative enactment, and there are numerous statements in the cases to the effect that the doing of that which the law authorizes cannot be a nuisance, or such a nuisance as to give a common-law right of action, although it would otherwise be one. It has also been held that when the legislature directs or allows that to be done which would otherwise be a nuisance, it will be valid on the ground that the legislature is ordinarily the proper judge of what the public good requires, unless carried to such an extent that it can fairly be said to be an unwholesome and unreasonable law."

* * * *

Complaint is made in effect that the Railroad Commission of Texas is undertaking to adjudicate the rights of the parties. We cannot give assent to this contention. Obviously the Legislature has no facility through which to administer the workings of the butane gas regulatory act. What the lawmakers did was to delegate to the Railroad Commission this task and to charge that agency with the duty of putting into effect the statute's complete provisions. There was no attempt to delegate to the Commission any judicial power, nor has that body in any sense undertaken to adjudicate the property rights of the parties. All it has done in this case is to undertake its statutory duty of administering the act. This was entirely proper. Housing Authority v. Higginbotham, 135 Tex. 158, 143 S. W. (2d) 79, 130 A. L. R. 1053, and cases there cited.

More Accurate Tests to Determine Thermal Conductivity of Materials

A NEW program to provide more accurate and dependable values of thermal conductivity for most of the insulating materials on the market has been initiated by the Committee on Research of the American Society of Heating and Ventilating Engineers, New York, N. Y., according to an announcement by L. P. Saunders, chairman. The program will be carried out by the Technical Advisory Committee on Insulation.

The first step in the program, and the one which is now actively under way, is the checking and accrediting of the laboratories which will do this actual testing in accordance with the new ASTM test code for Thermal Conductivity of Materials by Means of the Guarded Hot Plate (ASTM C 177-45). This code is the result of joint action of the American Society of Heating and Ventilating Engineers, the American Society for Testing Materials, the American Society of Refrigerating Engineers, and the National Research Council.

All of the commercial and university laboratories which are known to have hot plate equipment are being canvassed to determine whether their equipment conforms to the ASTM C 177-45 standards, and whether they are willing to undertake tests to establish correlations and determine the relative accuracy of the various pieces of test equipment.

To all the laboratories having acceptable equipment and indicating a willingness to participate in the plan, the ASHVE Research Laboratory will send a sample of insulating material. This sample will be tested in accordance with the ASTM C 177-45 code and returned, together with test results, to the ASHVE Research Laboratory, Cleveland. The same sample will then be sent to the National Bureau of Standards, Washington, D.C., where it will again be tested. Laboratories will be accredited on the basis of their ability to check within acceptable tolerances the values obtained at the National Bureau of Standards.

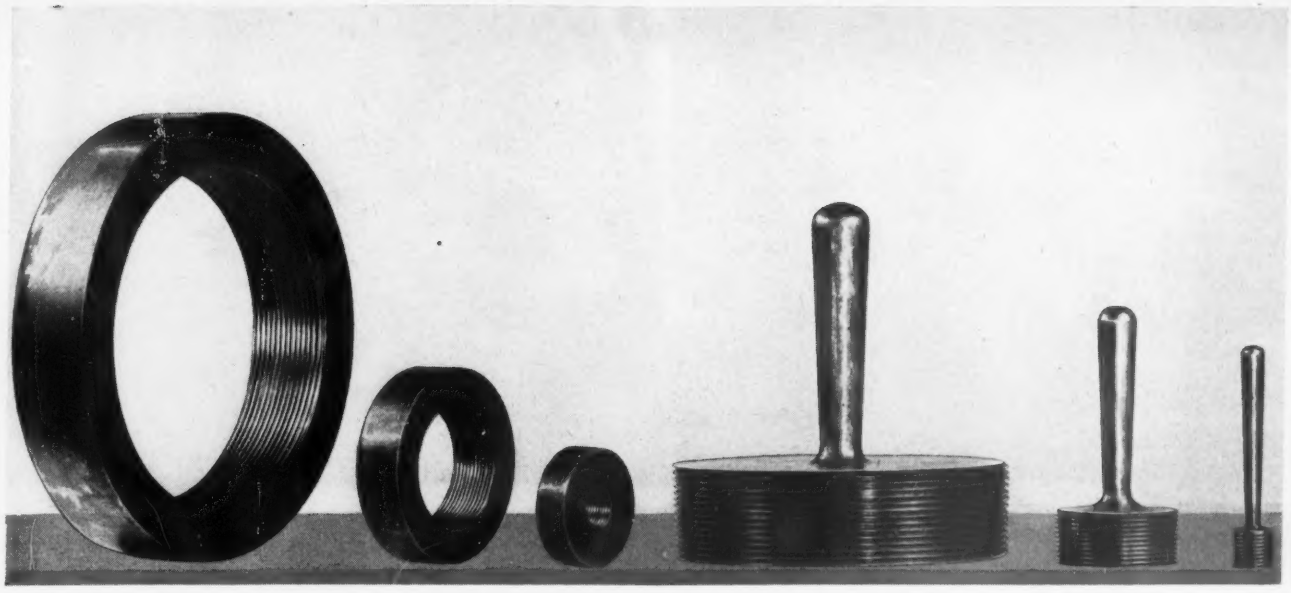
As soon as possible a list of approved laboratories will be made available to manufacturers of insulating materials, and they will be urged to have their products checked at one of the laboratories listed. It is hoped that the progress of this program will permit limiting the "k" (thermal conductivity) values for insulating materials to be published in the ASHVE Guide 1949 to those determined in accordance with this new ASTM code.

The program outlined is highly desirable according to Chairman Saunders. Currently published tables of conductivity values for insulating materials indicate that they have been determined by various laboratories, at various mean temperatures, and probably with various types of equipment. Also, improvement in insulating material during the past few years indicates a need for the rechecking of insulating values. In addition to insulations, many other building materials, which could be readily tested by the hot plate method, should have their "k" values redetermined. Manufacturers of certain roofing materials, noninsulating types of building board, etc, should find this program of particular interest.

Any laboratories which have hot plate equipment conforming to the ASTM code and which have not rereceived the invitation to participate should communicate with the ASHVE Research Laboratory, 7218 Euclid Avenue, Cleveland 3, Ohio.

"A battleship of the Iowa class uses 1,800,000 feet of electrical cable. As much as 400,000,000 feet of finely woven galvanized steel wire is used to protect these cables."

—*Steel in the War*



Three ring and three plug pipe thread gages, sizes 6, 2, and 1/2 in. used by Morris, Tasker & Company of Philadelphia, Pa., prior to 1886. These gages are in the possession of The American Society of Mechanical Engineers.

New Edition of Pipe Thread Standard

First American Standard approved in 1919 is now available in up-to-date edition, incorporating data developed to meet war needs; includes dimensions for "dryseal" pipe threads

By A. M. Houser

THE use of piping is so common in the United States that it is difficult to begin any construction project, large or small, without arranging for a supply of pipe and pipe accessories. The common connection of pipe-to-pipe and pipe-to-fittings-and-valves is that of a threaded joint. This threaded joint has been established on such a simple basis that even most homes have facilities for making the ordinary threaded pipe joint.

The background of this thread is of interest when reviewing the present standard practice and the development of the many details that have been found necessary to provide for the installation of the variety of products calling for some form of the American Standard Pipe Thread.

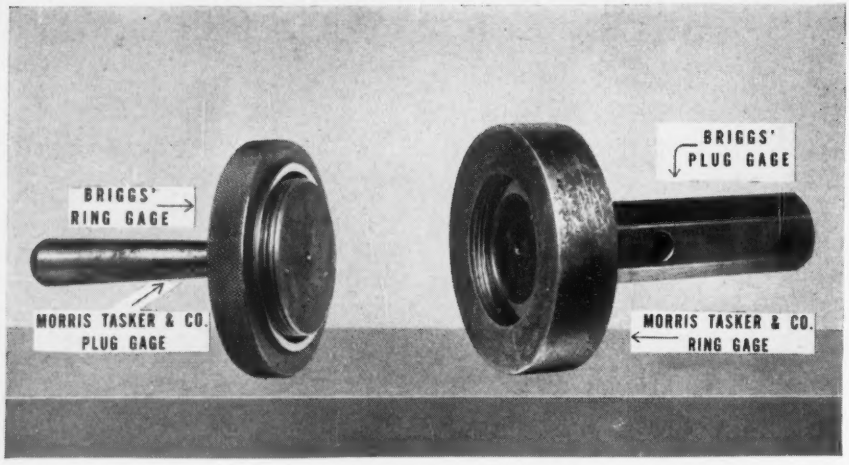
The use of threaded tubes or pipe antedates any definite record. It seems that threads for sizes up to 10-inch and inclusive were being cut as far back as 1820. This early practice grew out of the experience with product furnished by the British tube trade. There seems to be no record of the form or pitch of the thread used in those early days.

While the Briggs form of pipe thread was made a matter of public record after his death, when his paper was read before the Institute of Civil Engineers of Great Britain, 1882-1883, Robert Briggs had developed this type of thread at least as early as 1865. This is substantiated by the fact that the same illustration which he used later in describing his pipe thread, appeared in a paper on screw threads which he read at that time, although he made no particular reference in this paper to pipe threads.

The Briggs pipe thread established the pitch of the screw thread and its application only to the outside of the pipe. Nothing in the Briggs formula provided for the establishment of the number of threads that should be used to make a pipe joint. It would seem that Mr Briggs must have set up some practice of his own for tapping screwed fittings but we find no record of this application of the pipe thread.

Manufacturers were using practically the present standard pitches of thread as far back as our records

A. M. Houser, *Crane Company, Chicago, is chairman of the Subcommittee on Editing and Gaging, of the Sectional Committee on Standardization of Pipe Threads, B2. He represents The American Society of Mechanical Engineers, one of the sponsors, on the sectional committee, and has been active for many years in the standardization work he describes.*



Relationship between 2-in. pipe plug and ring thread gages made by Morris, Tasker & Company, prior to 1886 and the Briggs Standard Gages. These gages are flush at the large end and the differences in their thread lengths should be noted.

exist and, including the tapered form, usually 3/4 inch per foot, the thread in use throughout these years has been virtually the same. There have been some variations recorded in pitch diameters and in gaging practice.

The following is quoted from Mr Briggs' paper of 1882 to indicate the problem he had in preparing a definite set of values:

> "The number of screw threads per inch for the several sizes of tubes is here accepted from customary usage. It is the workman's approximation to the pitch practically desirable, and much reluctance must consequently be felt in calling it in question. . . . The existing number of threads, however, as given in Tables I and II, are now too well established to be disturbed; at all events, they must be taken in any statement of present practice."

At the Sixth Annual Meeting of The American Society of Mechanical Engineers held in Boston, November 12, 1885, George M. Bond of Hartford presented a paper on "Standard Pipe and Pipe Threads". Mr Bond gave Briggs credit "for bringing engineering principles to bear on this subject". This paper also presented the need for some action to correct the state of divergence in practice at that time.

William Kent moved for the appointment of a committee to consult with pipe makers, users, and the makers of pipe-taps and dies to investigate the possibility of developing a standard for pipe threads. During the discussion, Mr Kent made reference to "the difficulty of connecting the American system with that of the British".

President J. F. Holloway appointed the following committee in November, 1885:

Frederick Grinnel, Providence, *Chairman*
George Schuhmann, Reading
William J. Baldwin, New York
B. H. Warren, Boston
George M. Bond, New York, *Secretary*

It is of interest also to record that Mr Bond referred to a letter received from Mr Briggs dated February 29, 1882, in which reference is made to his paper to be published and "he claimed as his idea the standard list of pipe diameters as prepared by him when superintendent of the Pascal Iron Works in 1862 and before".

The plug and ring gages were made by Morris, Tasker & Company of Philadelphia, Pa., while Briggs was their superintendent. Briggs was later consulting engineer for the Reading Iron Works up to the time of his death. The following is quoted from the report of the above-named committee:

> "A meeting of this committee was held in Hartford on February 23, 1886.
>
> 'The opinion of this Committee is that the Briggs Standard which nearly all, if not all, of the pipe manufacturers once adopted, is the proper standard to be adhered to, and that it only requires definite cooperation on the part of pipe manufacturers with the committee, in order to bring their product strictly to that Standard, and to adopt means of strictly adhering to it within practical limits.' "

At the ASME meeting held in Chicago, Ill., May 25-28, 1886, Mr Bond, as secretary, reported on the progress made by the committee. This report included reference to a committee appointed by the Manufacturers of Wrought Iron Pipe and Boiler Tubes in the United States at a meeting held in Philadelphia, May 12, 1886, the members of which were:

L. W. Shallcross, Morris, Tasker & Company, *Chairman*
J. H. Flager, The National Tube Works Company
L. J. Piers, The Allison Manufacturing Company
James H. Murdock, Secretary of Committee

The report also included action taken by the Cast Iron Fittings Association at a meeting held in New York, N. Y., May 19, 1886, when the following committee was named:

R. T. Crane, Crane Bros Manufacturing Company
C. C. Walworth, Walworth Manufacturing Company
E. G. Burnham, The Eaton, Cole & Burnham Company
Charles Jarecki, Jarecki Manufacturing Company
Carleton W. Nason, Nason Manufacturing Company

At the Seventh Annual Meeting of the ASME held in New York, November 29-December 3, 1886, Secretary Bond reported for the committee. This report sums up the various actions taken, including the formulas and tables of values included in the paper by Robert Briggs. The discussion which followed brought out the interesting fact that in establishing this standard, Mr Briggs' proposal had been followed by the manufacturers and that their committee actions were the means of establishing the uniform practice. The action taken by the Society was "that the report of the committee be accepted with thanks of the Society and ordered printed in the ASME transactions".

It is of interest to note further that this report includes a statement covered in a letter from a Dr Chaney of England in reference to "the very unsatisfactory condition of pipe thread standard in that country"; also the statement that "our committee has not undertaken to correspond with English manufacturers because their standard is different than ours; the threads are cut straight and are different in pitch".

The Manufacturers of Wrought Iron Pipe and Boiler Tubes adopted dimensions at a meeting held in Pittsburgh, October 27, 1886, for sizes through the 10-inch. These dimensions were published in a circular distributed by Pratt & Whitney dated May 22, 1889, and the values agree with the table included in Mr Briggs' paper. These dimensions were endorsed and adopted by the Manufacturers' Association of Brass and Iron, Steam, Gas and Water

Work of the United States, on December 8, 1886, and were confirmed, with the exception of the 9-inch size at a meeting of the Manufacturers of Wrought Iron Pipe and Boiler Tubes in New York, N. Y., on May 9, 1889.

In order to produce threaded products that could be more readily interchanged between various manufacturers and make satisfactory joints, standard plug gages were established to check internal threads. The earlier plug and ring gages both had a thread length equal to the present L_2 dimension. These gages agreed both at the crest and root of the thread with the Briggs formula. In order to gage properly the diameters of the thread, it was necessary that the sides of the threads of the gage bear on the sides of the thread on the product. To accomplish this it was necessary to truncate the crest of the thread on the gage so as to prevent interference at the root of the product. It was finally agreed that this truncation should be one-tenth (0.10) of the pitch. Prior to 1913, the practice of manufacturers varied in the application of the established plug and ring gages.

As the need grew for making up threaded joints with products of different manufacturers, it was found necessary to establish the diameter of the internal thread so that the regular Briggs external thread could be made up wrench tight before shouldering. This problem led to the use of the ring gage now known as the L_1 thin ring gage, and the corresponding plug gage having the L_1 notch.

A committee was appointed by the ASME in 1913 to establish the dimension of the thin ring gage and a corresponding notch on the plug gage; this is known as the L_1 gage. Colonel E. D. Meier was appointed chairman, with members representing manufacturers of pipe, fittings, and gages, and the ASME. The Council of ASME authorized the printing of this committee's report in November 1913.

The combined tolerance on both the gage and the product has been on the basis of 1½ turns from basic. The gage is allowed ½ turn from basic, and the product one turn from the gage. While this gaging tolerance on products may seem impractical from a theoretical standpoint and would seem to indicate that in extreme cases the threads would hardly enter or would shoulder before becoming wrench-tight, in practice the full tolerance on both an external and internal thread to be assembled never seems to occur.

All kinds of equipment involving the use of pipe, pipe fittings, couplings, and the great variety of valves and piping specialties, ranging from plumbing and other low pressure work to the higher pressures and temperatures, comply with these standards, and due to the general satisfaction given, prove that the theoretical problem of assembly is of no consequence.

The first data appearing as a complete standard was published in the *Transactions* of The American Society of Mechanical Engineers in 1919. This material was later approved by the American Standards Association as the first "American Standard" and published by the ASME as ASA B2-1919. Due to a number of circumstances, the first revision was delayed until 1942 and was published by the ASME as ASA B2.1-1942.

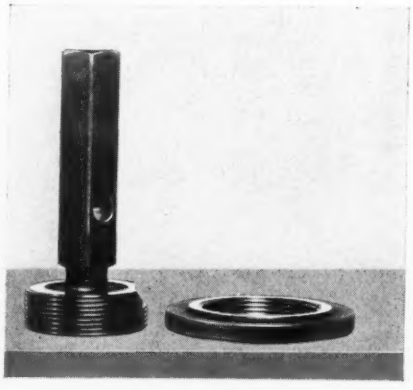
Due to the need for additional data on pipe threads and gaging during World War II, a further revision was undertaken which resulted in the present American Standard B2.1-1945. The whole-hearted manner in which engineers having an interest in the production, gaging, and use of pipe threads cooperated in the necessary work of checking each problem as it came to light and in checking and rechecking the several tentative drafts, has made the present and more complete publication possible.

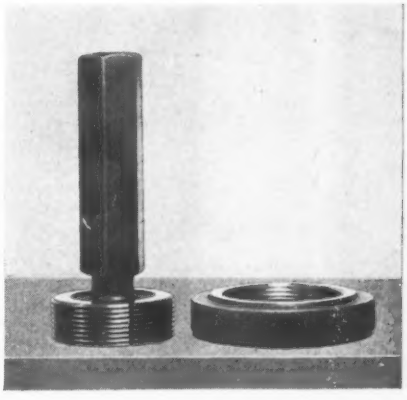
This 1945 revision provides the required information on the subject of pipe threads for any reasonable project requiring some form of thread—taper or straight—for services from that known as "general service" to that demanding more exacting gaging practice.

The symbols covered in Appendix I, while practically the same as those in the 1942 edition, were carefully reviewed in connection with the nomenclature project of Conference for Unification of Engineering Standards, Ottawa, 1945, and are now accepted by the joint committee of U. K., Canada, and U. S. A. These symbols are now considered standard by all groups in this country, and it is expected that they will also become the common language in both the United Kingdom and Canada. It is claimed that this feature alone will effect considerable saving in time, inconvenience, and money.

The standard now includes the fundamentals for the "Dryseal Pressure-Tight Joints". The close requirements for this type of pipe thread were developed during a period of years for service where the use of any lubricant or sealer was considered undesirable. The details for crests and roots which cover the only difference between the Dryseal and the regular thread, and the advantages to be gained by the Dryseal, are illustrated in the standard.

The following list of subjects in the standard is mentioned to indicate the variety of information required by the different industries. They are covered either by description, illus-

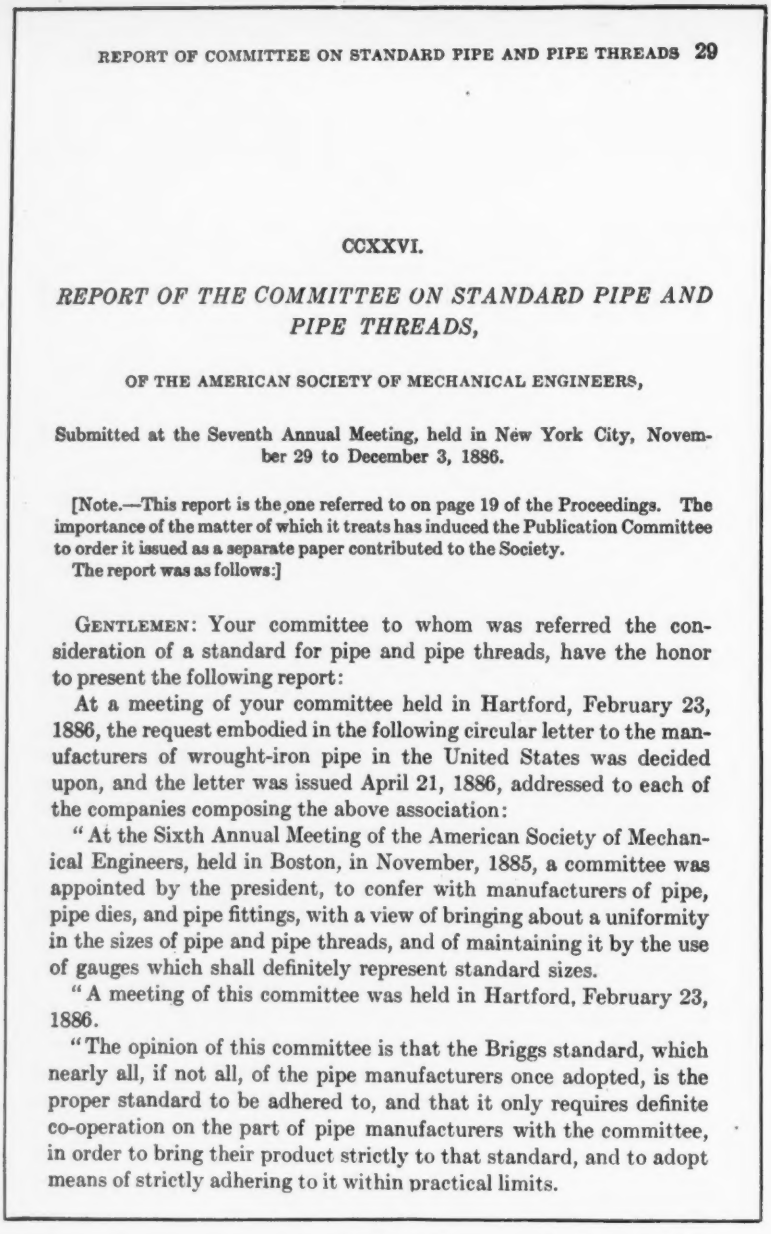




Left:—2-in. American Standard pipe thread gages (L_1 thread lengths)

Photos—A. M. Houser, The American Society of Mechanical Engineers

Right:—2-in. Briggs Standard pipe thread gages (L_2 thread lengths)



REPORT OF COMMITTEE ON STANDARD PIPE AND PIPE THREADS 29

CCXXVI.

REPORT OF THE COMMITTEE ON STANDARD PIPE AND PIPE THREADS,

OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS,

Submitted at the Seventh Annual Meeting, held in New York City, November 29 to December 3, 1886.

[Note.—This report is the one referred to on page 19 of the Proceedings. The importance of the matter of which it treats has induced the Publication Committee to order it issued as a separate paper contributed to the Society.
The report was as follows:]

GENTLEMEN: Your committee to whom was referred the consideration of a standard for pipe and pipe threads, have the honor to present the following report:

At a meeting of your committee held in Hartford, February 23, 1886, the request embodied in the following circular letter to the manufacturers of wrought-iron pipe in the United States was decided upon, and the letter was issued April 21, 1886, addressed to each of the companies composing the above association:

"At the Sixth Annual Meeting of the American Society of Mechanical Engineers, held in Boston, in November, 1885, a committee was appointed by the president, to confer with manufacturers of pipe, pipe dies, and pipe fittings, with a view of bringing about a uniformity in the sizes of pipe and pipe threads, and of maintaining it by the use of gauges which shall definitely represent standard sizes.

"A meeting of this committee was held in Hartford, February 23, 1886.

"The opinion of this committee is that the Briggs standard, which nearly all, if not all, of the pipe manufacturers once adopted, is the proper standard to be adhered to, and that it only requires definite co-operation on the part of pipe manufacturers with the committee, in order to bring their product strictly to that standard, and to adopt means of strictly adhering to it within practical limits.

Reproduction of page from ASME Committee's Report, 1886.

tration, data in tabular form, or in the appendixes:

- Form of thread and basic formulas
- Limits on crest and root of external and internal taper pipe threads
- Specifications for plug and ring gages for taper pipe threads
- Method of gaging and manufacturing tolerances for threaded product
- Basic dimensions, American Standard taper pipe threads
- Dimensions of threaded plug and ring gages
- Specifications for Dryseal pressure-tight joints
- Specifications for rail fitting joints
- Specifications for straight pipe threads, mechanical joints and locknut connections
- Definitions and letter symbols
- U. S. Army Ordnance method of gaging pipe threads
- U. S. Army-Navy-Aeronautical special gaging practice
- API method of gaging line pipe
- Method of gaging Dryseal taper and straight pipe threads
- Twist drill diameters for tapped holes for pipe threads
- Threading of pipe for American Standard steel flanges
- Locknut pipe joint for tank nipples
- Small hose coupling screw threads
- Taper pipe threads connecting discharge valves to compressed gas cylinders
- Rigid steel conduit and fitting threads
- Straight pipe threads for bung plugs and flanges of steel barrels and drums
- Table of pitch diameters of taper pipe threads shown in their relation to E_1

The American Standard for Pipe Threads, B2.1-1945, should become the handbook on pipe threads for producers, users, and general interests.

FTC Defines "Azlon"

Adoption of the term "azlon" as a generic name for man-made natural protein base fibers was agreed upon at a recent trade practice conference called by the Federal Trade Commission. These fibers, manufactured principally from casein of milk, soy beans, and other sources of natural protein, are used primarily as a textile product in making men's, women's, and children's garments.

Much discussion was provoked by the report of a special committee which had drawn up suggested trade practice rules for the new industry. In addition to defining the scope of the word "azlon", these rules provided for accurate labeling and identification of fabrics containing the fiber, trademarks, and advertising practices. A number of suggested changes and additions were made by members of the trade. These will be studied and a revised set of rules will be submitted later.

U. S. Committee, IEC, Considers Postwar Plans

The Executive Committee of the U. S. National Committee, International Electrotechnical Commission, met May 21 and agreed on its recommendations for affiliation of the IEC with the proposed new International Standards Coordinating Association. A meeting of the Council of the IEC is being held July 8-10 in Paris, France, to consider the recommendations of all the national committees concerning the affiliation. E. C. Crittenden, president of the U. S. National Committee and member of the IEC Council, is attending the meeting. P. G. Agnew, vice president and secretary of the American Standards Association, has been appointed a delegate for this meeting.

The American Standard on Pipe Threads, B2.1-1945, was prepared by the Sectional Committee on Standardization of Pipe Threads, sponsored by the American Gas Association and The American Society of Mechanical Engineers.

Copies of the standard are now available at $1.50.

Dollars for Your Thoughts

By Colonel Leslie E. Simon

How the Ordnance Department used statistical methods of quality control to prevent destruction of tank armor during tests, and found huge savings in material and cost

IT is manifest that a primary consideration in the writing of a specification is a clear knowledge of just what one wants. Let us call the description of the ideal the *design* specification because that is what Shewhart called it when he laid some sound principles for the writing of specifications in 1934.[1] Of course the ideal quality described by the design specification is a thing apart from the purchasing specification in which our major interest lies because, in this uncertain world in which we live, the best that the purchasing specification can do is insure with some assigned probability that the accepted articles will meet the requirements of the ideal. Let us consider what happens in the absence of an ideal or design specification.

Some years ago I was in charge of a group of metal shops that made piece parts for artillery fuzes. One of my jobs was to make a mechanism which, if manufactured according to the specification, should not function under an applied load of L_1 pounds (for safety reasons) but should function with certainty under an applied load of L_2 pounds. The acceptance test consisted of firing a small sample of fuzes in normal gun fire. Failures were occurring both in the tests of the mechanisms to function properly for the tolerance range L_1 to L_2 and in the ballistic firings of the completed fuzes. The shops were in the usual state of confusion that accompanies a trouble for which one cannot find the cause. A brief examination of the physics involved showed that a much greater tolerance range than L_1 to L_2 could actually be allowed. Therefore I asked the engineering staff who wrote the specification to please relate the history of the case. They stated that they realized initially that a large tolerance range, say L_7 to L_8 could be allowed; but since they felt that the allowable tolerance range was greater than necessary, and since they feared that violations of the specification limits would occur, they allowed initially only a smaller tolerance range, say L_5 to L_6. Subsequently trouble occurred, so, to tighten up on quality, they cut the tolerance range to new limits, say L_3 to L_4. Trouble occurred again and they cut the tolerance range to the still closer limits of L_1 to L_2. They admitted that there was not much logic in specifying super quality with the hope that perhaps a slight improvement in a much poorer existing quality would result.

What really happened was that unrealistic specification limits led to unrealistic methods of testing; unrealistic methods of testing led to poor manufacture; and finally poor manufacture led to a product which did not meet even the broad tolerance range which could be allowed under the physical laws which governed the functioning of the mechanism.

Quality Control Method of Testing Employed

With this understanding of the problem, and the use of statistical methods, it was easy to put in a quality control method of testing which insured with a high degree of probability that the mechanism would function properly.

The engineering department had a clear enough basis for a design specification. They did not use it. They followed the customary procedure of choosing arbitrarily small tolerance limits, and prescribing that a small sample should be taken from each batch and that none should fail to meet tolerance requirements. If they had used information as a basis for describing clearly what they wanted and for writing an acceptance test procedure which would insure with high probability a satisfactory quality level for the accepted product, they would have procured a cheaper product and have avoided the successive troubles which

Statistical methods offer a means for determining in an economic way (1) what quality of product one wants, (2) what product one should strive to get, and (3) how one can operationally verify with a chosen probability that the accepted product will meet the requirements of the one he chooses to try to get. By taking the thought necessary to achieve these three steps both purchaser and vendor can be saved great expense, Colonel Simon shows.

Colonel Leslie E. Simon served during the war in the Ordnance Department at the Aberdeen Proving Ground, Maryland. He is a member of the ASA War Committee that prepared the three American War Standards on the Use of Statistics in Quality Control.

This article is abstracted from a paper presented as part of the Symposium on Quality Control at the Spring Meeting of the American Society for Testing Materials and published in full in the *ASTM Bulletin*, March 1946.

[1] Walter A. Shewhart, "Some Aspects of Quality Control," *Mechanical Engineering*, December, 1934.

they attempted to remedy in the wrong way.

Quality Determination

Let us assume that we have determined what quality we want. The next step is not describing that quality, for the vendor may not be vitally concerned about what we want, but of *describing clearly what acceptance tests we shall perform upon the vendors' product* in order to assure with some degree of probability that the product will meet the ideals of the quality which we want. It is these tests which really put teeth into the specification and make it binding.

Quality control is essentially a method of process inspection which, over a period of time, indicates the general level of quality and detects changes in quality when they occur. This procedure can be used as an acceptance technique with one important change: instead of heeding an indicated change in quality as an evidence of trouble in the process and doing something to correct the process, we take the indicated change in quality as evidence for rejecting the vendor's product, subjecting his product to very scrupulous inspection, or otherwise insuring the quality of the questionable portion of the product.

A quality control procedure can be written into a purchasing specification in such a conventional and straightforward manner that only a statistician would know that the specification was predicated on sound quality control principles. These procedures are described in detail in Shewhart's original book[2] on the subject, in the publications of the American Standards Association,[3] and elsewhere. I have described their application to specifications in two previous publications.[4]

In the beginning of the war, current specifications for tank armor were of the conventional type and required that samples of armor plate be tested by firing at the plate with armor-piercing projectiles in a prescribed manner, and that none should fail. Armor plate was being destroyed in testing at Aberdeen Proving Ground at a rate sufficient to make a very large number of tanks per year, and the Chief of Ordnance desired that the principles of quality control be applied to the acceptance testing of armor-plate testing as a method of quality determination in order to conserve this product, reduce the cost of acceptance testing, and improve the quality of the plate. I asked to be excused from responsibility for this assignment on the grounds that statistical knowledge was insufficient qualification for the task because it required also a knowledge of metallurgy and other engineering principles involved in the tests. However, I collaborated with Edward M. Schrock in designing the acceptance procedure which was finally adopted.

Difficulties Encountered

It turned out that there were no technical or engineering difficulties to prohibit a straightforward application of quality control techniques. However, the exigencies of war presented a serious and unusual problem. Retesting could serve no useful purpose. Sorting by 100 percent inspection was impossible because the test was destructive. In short, there was no way to penalize a manufacturer financially for his bad product, but we thought of a way which was probably more effective even than financial penalties.

It was decided to reject no product on a basis of the quality control technique. Instead, the old specifications were kept in their entirety, even though they required much more testing than was necessary if a manufacturer made good armor plate with a controlled process. A few words were merely added to each of the specifications to the effect that if a manufacturer had thirty-two consecutive tests or eight averages of four items each (representing thirty-two lots) which fell between certain limits (the limits were predicated upon probabilities derived from quality control procedures), his acceptance samples were cut to one third. If the next sixteen tests or four averages based on four items each fell within limits, the manufacturer's acceptance samples were cut to one sixth the initial amount. These cuts in sample size were highly justifiable because, if a manufacturer has been producing satisfactory quality over a period of time with no change in the quality level, it takes less evidence to assure one of his quality than that required of a manufacturer who jumps his quality about from time to time.

This procedure was very effective even though it did not directly penalize the vendor. If several vendors accepted contracts for a certain type of armor plate, and after a period of time some of them went on the reduced sampling basis, but one or more others were required to stay on the standard sampling basis, the presidents of the companies who failed to gain the favored status would come to Aberdeen at once to find out why their product was regarded more critically than that of their competitors. Quality control charts showed clearly the situation and the companies often identified the causes for variation in their product, corrected the causes, and improved the product. The vendors even wrote letters of thanks to Aberdeen Proving Ground in appreciation of having the variations in their product called to their attention thereby enabling the vendors to manufacture a better and more economical product.

New Procedure Enables Great Savings in Samples

This procedure was operated by the Ordnance Department during almost the entire war and it saved the Government approximately four-fifths of the total number of samples (amounting to hundreds of tanks) that would have been used under the conventional type of specification, the corresponding testing effort, and consistently assured a much better product than could have been hoped for under the conventional type of specification. The improvements occurred even during a period of shortages of alloying materials, and quality was kept up so well that the Director of the Metallurgical Laboratory at Watertown Arsenal was led to remark that we would continue to have good armor plate if we just did not run out of water in which to quench it. Of course, we must recognize the work in research and development by the metallurgist at Watertown Arsenal, in plants producing armor, and at research agencies working under the

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[2] Walter A. Shewhart, "Economic Control of Quality of Manufactured Product," D. Van Nostrand and Co, Inc, New York, N. Y. (1931).

[3] American War Standards, Guide for Quality Control, Z1.1-1941; Control Chart Method of Analyzing Data, Z1.2-1941; Control Chart Method of Controlling Quality During Production, Z1.3-1942.

[4] Leslie E. Simon, "An Engineers' Manual of Statistical Methods," John Wiley and Sons, New York, N. Y., (1941). Leslie E. Simon, "Contribution of Statistics to the Development and Use of Purchasing Specifications and Standards of Quality," University of Pennsylvania, 1940. Reprinted Army Ordnance, March-April 1941.

direction of National Defense Research Committee.

Distinction Between Design Specification and Inspection Specification

It has been pointed out that the first step in the writing of a specification should consist of thinking out clearly just what one wants. A description of this desired quality shows clearly the end toward which one intends to work. It is a goal and not a quality mark which one can reasonably expect to meet 100 percent of the time. In fact, the heart and soul of economic specification consists of accepting a calculated risk that the accepted product will not meet the quality goal.

Whether one publishes this design specification is unimportant. The important thing is the writing of an economic inspection or acceptance specification which the design specification makes possible. The inspection specification has one function only, and that is to describe *the quantity* and *kind of evidence* which will be accepted as satisfactory proof that the product will meet the design specification. The unwritten (or not published) specification describes a goal; the written specification describes a basis for judging whether the product will meet that goal. The second specification differs from the usual 100 percent conformance specification chiefly in that it describes an inspection and sampling procedure which is calculated by means of statistical methods to yield a high probability (less than certainty) that the product will meet the goal of the design specification.

Only one basis for writing the acceptance specification has been discussed; namely, the use of the quality control technique as a quality determination procedure. It should be noted that the use of this procedure involves certain limitations. Its most stringent limitation consists of the requirement of order, that is, the samples must be taken in the order of production. It has great advantages in economy and is especially useful where the inspection or testing method is destructive, but it should be clear from the example which has been given that the quality control procedure really does not yield much information about the discrete batches of product which are presented for inspection; its most valuable information refers to the quality of the aggregate of all the batches. It yields an assurance that the whole flow of product from a manufacturer will, with some calculated risk, meet the ideal of the design specification. *It samples the process rather than the product.*

It is obvious that the quality control technique works ideally when a single consumer is accepting the entire output of a producer, or at least when successive lots or batches come from the same producers. It is not a *screening* technique for distinguishing between good and bad lots of product offered by various vendors.

However, there are many strings to the statistical bow and I would like to give you an example of how our Government saved many millions of dollars during this war by the use of statistical screening techniques.

Sampling Table Drawn Up

By way of preliminary explanation, let us suppose that a manufacturer is offering piece parts for acceptance in lots or batches. Let us further suppose that by inspection a part can be classified as good or bad, as defective or not defective, as conforming or not conforming. Suppose further that some degree of defectiveness can be tolerated—for example, 1 percent. It is easy to see that a sampling table can be drawn up somewhat thus:

Out of a lot of 1000 pieces take a sample of 50. If the number of defectives is 0 or 1 the lot will be accepted; if the number of defectives is greater than 3 the lot will be rejected. However, if the number of defectives is 2 or 3 a second sample of 100 shall be taken and the total number of defectives in the two samples combined (150 items) shall not exceed 3.

The common sense of the procedure is obvious. If the lot of articles is very good or very bad, the first small sample gives sufficient evidence for identifying its quality. If, however, the lot of articles is of marginal quality, a larger sample is necessary for the finer degree of distinction.

As war production got under way, the Ordnance Department was faced with a perfectly enormous acceptance program. It was necessary that all vendors be treated fairly and alike; it was necessary to get enormous quantities of ordnance matériel quickly; and finally it was necessary that arms and ammunition be reliable and safe. Here was a sampling problem of unprecedented scale.

Factors Affecting Choice of Technique

Since the quality control technique had already worked well in several acceptance sampling procedures, it might have been possible to convince the Ordnance Department that it should apply this method to all acceptance inspection or even that it should go a full step further and require statistical quality control of its contractors. Although these more drastic steps offer great economy and efficiency, neither of them would have been wise, at the time.

An attempt to require statistical quality control of manufacturers, although ideal, would surely look like discrimination, and bring a storm of protest. There were certainly not enough quality control engineers in the country to administer quality control, even if it were already running. Finally, statistical quality control has no place in production until at least a reasonably good state of engineering control has been attained, and many of the new manufacturers were doing well to produce at all. To have advocated quality control in process would have been very detrimental to its orderly introduction in American industry, and would not have helped acceptance inspection.

The use of the quality control technique for quality determination likewise seemed unpromising. There were two major difficulties. First, it would be almost impossible to meet the requirement regarding the selection of samples in order of production. This requirement is not so exacting with respect to a major item like armor plate or even completed lots of mechanical time fuzes, but if it were extended to all the manufacturers of all sorts of piece parts, each with his idiosyncrasies of production, it would be impossible to secure an adequate number of qualified inspectors. The second difficulty lay in the fact that the quality control technique results in sampling the production process rather than the units of product. It was known that quite too many of the production processes were unsatisfactory.

Hence, there was an obvious requirement for an efficient screening

process. It was expected that the statistical screening process would (1) keep out most of the bad parts; (2) make available most of the good product even though much of it came from manufacturers who produced a considerable amount of faulty product, and (3) stimulate improvements in quality because the vendor would know that the degree to which he met the specification was being checked in an efficient, fair, and operationally verifiable way.

The single and double sampling inspection table by Dodge and Romig[5] (not then published as a book) offered good initial material for the design of inspection procedures. However, it is seldom that existing procedures cover all of one's requirements; and upon consultation between the representatives of Ordnance and the Bell Telephone Laboratories, it was finally decided to get out entirely new tables specially designed to meet the task.

These tables were designed so that it was very simple for an inspector to do an efficient job, even when lots or batch sizes varied greatly. Furthermore, the procedures were so marked that Ordnance could always know the level of quality of product which it was getting and approximately the probability that the product would meet the requirements of the design. It is important to note in this connection that the Ordnance Department actually set up *acceptable quality levels* for a great many items. The flexibility of the tables allowed the acceptance criteria to be varied in a reasonable way; for example, if a defect was of such a nature that it would be detected during assembly and a nondefective part could be easily substituted, acceptance criteria were liberal; if, on the other hand, the defective part were such that it would not be discovered until used in the field, acceptance requirements were much more rigorous.

The valuable contributions of the inspection acceptance sampling plans to quality and quantity of ammunition are well recognized today. Huge savings in materials which would otherwise have been rejected, man-hours in labor, dollars of cost, and even of lives on the battlefield are due at least in part to these improvements in acceptance techniques. However, the procedures which were used are common knowledge. They are available to all of us in books, pamphlets of the American Society for Testing Materials and the American Standards Association, and in published articles.

The huge savings were made possible because a small group of people chose to *think;* to (1) *determine what quality was wanted,* and (2) *to set about getting it by describing a sampling and inspection technique which would assure with an acceptable degree of probability that the product will have the quality wanted.*

[5] H. F. Dodge and H. G. Romig, "Sampling Inspection Tables," John Wiley and Sons, New York, N. Y. (1944).

NEMA Announces Electric Arc-Welding Machine and Electrode Standards

A COMPLETE set of new standards for electric arc-welding machines and electrodes has just been released by the National Electrical Manufacturers Association. The new edition, No. 45-105, covers for the first time alternating-current welders for farm and small community repair shops—an important postwar requirement.

The welding standards, developed by the Electric Welding Section of NEMA, cover direct-current welders of both variable-voltage and constant potential types, including circuit control equipment for the latter. Also included are two types of alternating-current transformer type arc welders, designated as the industrial-type single operator, and the limited-input type.

The new standards coordinate and simplify the method of rating welders without basically changing the size of the welder. For example, the 300-ampere d-c welder with a specified maximum and minimum output, as covered by the revised standards, does not basically differ in actual welding capacity from a 300-ampere d-c welder meeting the requirements of the superseded standards.

Heretofore, direct-current welders were rated on a short-time basis, and alternating-current welders (except large machines used in automatic welding) were rated on a duty-cycle basis, each with a maximum and minimum welding current. The duty cycles serving as a basis for rating the a-c welders were slightly lower than the duty cycle corresponding to the short-time, 1-hour, and ½-hour ratings of the d-c welders. The new standard, using the direct-current welders as a base, rates both d-c and a-c welders on the basis of the same duty cycles. In addition, a definite duty cycle has been assigned to the maximum output.

A new standard for transformer arc welders below 200 amperes is introduced for the first time. These welders are designated as limited-input type, transformer arc welders. This new standard is developed to apply to welders served by single-phase power lines of limited capacity supplying farm or small communities.

These welders are rated on the basis of maximum output at 20 percent duty cycle at a load voltage which gives satisfactory welding, as it is believed that these welders will not be subject to the severe duty encountered in industry. A maximum input is assigned which must not be exceeded in meeting the maximum output. The input is limited so that power companies serving the welders may know what to expect as maximum line load conditions.

Test procedure for temperature, efficiency, and dielectric tests have been revised and brought up to date to correspond to latest American Standards.

The electrode standards have been revised and published in two parts. The part covering classifications, standard diameters, and package weights is included in the present publication. The new standard for color markings for electrode identification is published as a separate standard, No. 45-108.

Copies of the new NEMA Electric Arc-Welding Machine and Electrode Standards may be obtained from the National Electrical Manufacturers Association, 155 East 44th Street, New York 17, N. Y.

How to Mount Grinding Wheels Properly

ALTHOUGH responsible manufacturers take every possible precaution to produce grinding wheels that are free from defects, the user should take special precautions to prevent accidents by determining whether the wheel has been damaged in shipment, and by keeping it in good condition, declares *Power* in an article published in its April issue. One of the important precautions a user can take, *Power* states, is to consult the American Standard Safety Code for the Use, Care, and Protection of Abrasive Wheels, B7-1943, for adequate information on flange construction.

Before shipment, grinding wheels are carefully inspected, and those over 5 in. diameter are subjected to a speed test high enough to reveal inherent weakness.

The procedure to be followed by users in checking on the condition of

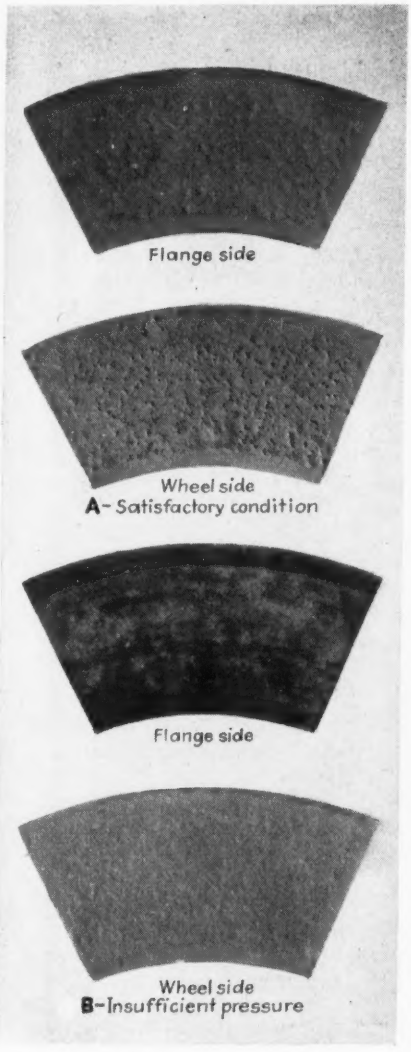

Fig. 1—If nut is tight, grain imprint is on flange side of washer, A. If too loose, the flanges slip and burn washer, B.

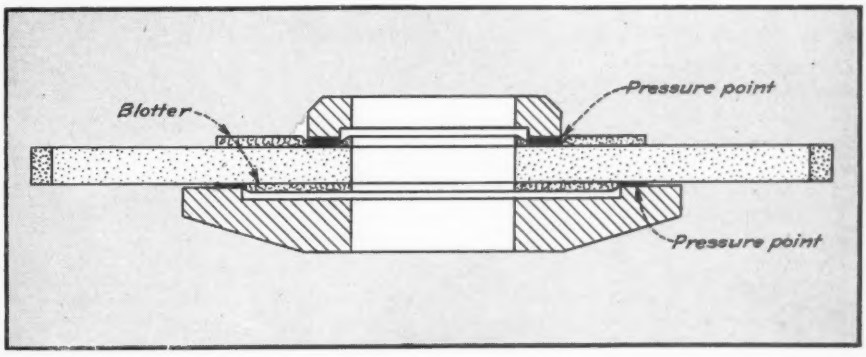

Fig. 2—Flanges of unequal diameter are a definite accident hazard. Unbalanced pressure of the flanges will break the wheel. Also the lower washer is too small and wheel flange does not have full bearing surface on the soft washer. This should be watched carefully.

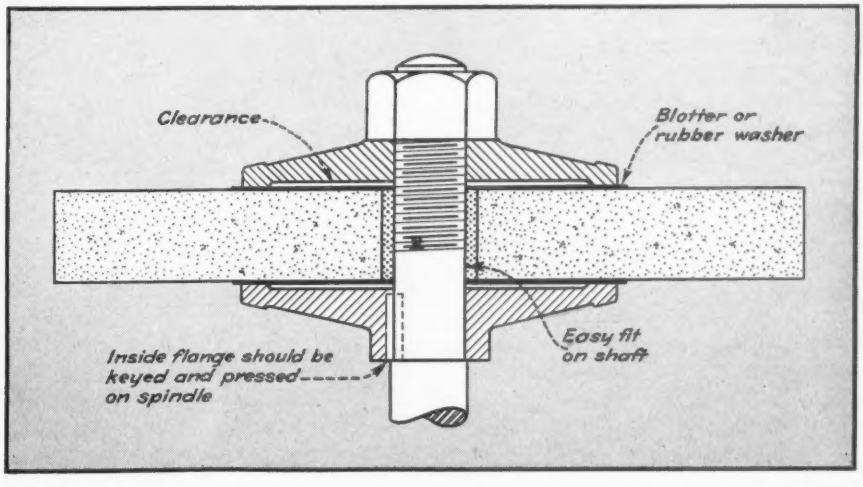

Fig. 3—A correctly mounted wheel has an easy fit on the shaft; inner flange keyed and pressed on the spindle; both flanges of the same diameter and relieved to provide clearance and compressible washers between the abrasive wheel and flanges.

the grinding wheels they are putting into operation is described by *Power* as follows:

"Before mounting a wheel, suspend it free and tap lightly with a screwdriver handle or wooden mallet. If the wheel does not ring clear, a crack is indicated. Exceptions to this rule are rubber- and shellac-bonded, or damp wheels, also those recently unpacked, to which sawdust still adheres. Remove sawdust or other packing material and clean the wheel thoroughly.

"Next step is to prepare for mounting. First precaution is to see that both flanges are the same diameter with their inner faces machined out from the center as shown in Fig. 3. Second, cut blotting-paper washers or provide flange facings of compressible material to insert between the metal flanges and grinding wheel.

"Washers of blotting paper should not be over 0.025 in. thick; those of rubber or leather not more than 0.12 in. thick, with their diameter at least equal to that of the flange. Cut a hole in the washer center slightly larger than the spindle. If the flanges are faced with lead or babbitt the facing should be at least $\frac{1}{8}$ in. thick.

"Third, see that the hole in wheel center is just large enough to slide easily on the machine spindle without using force. After the wheel is in place and protected by suitable washers or facings, tighten the flange nut. Draw up only tight enough to hold wheel firmly and spin several times by hand to see whether it runs true. Consult the American Standards Association safety code, The Use, Care and Protection of Abrasive Wheels, for information on flange construction."

ASA Offers Editorial Services For More Uniform Standards

IN connection with their plans for the postwar period, the Board of Directors and the Standards Council of the American Standards Association have undertaken to strengthen the services that the ASA offers members and sponsors.

One means of accomplishing this is to provide an editing service for standards, in order to increase the "degree of uniformity in style, format, and presentation of technical data . . . not only in the standards published by ASA, but also where desired in the standards published by sponsors. . . ."

Since the Editorial Department of the ASA has been expanded, the American Standards Association can now offer sponsor organizations the services of personnel capable of giving editorial advice on draft standards, preparation of standards for printing, and proofreading.

Also of great value for use in attaining a high degree of consistency is the recently proposed style manual, developed by the editorial staff of the Association and now being circulated to sponsors and committees for comment. Intended to serve as a guide for the publication of American Standards, the draft is a codification of editorial practices especially applicable to ASA procedure. These practices are based on Webster's International Dictionary, the University of Chicago Style Manual, and on approved American Standards for abbreviations, letter symbols, and drawing practices, etc.

It is hoped that the manual, together with these various editorial services, will assist in the work of standards committees; that they will make for uniformity and clarity in presentation; and that they will facilitate the use of the standards. Copies of the proposed style manual can be obtained from the American Standards Association and any comment and criticism will be welcomed.

Accountants Recommend Standard Procedures

Accounting procedure of a uniform nature is strongly urged by the American Institute of Accountants, the *Journal of Commerce* reports. Spokesmen for the Institute believe that if a standard form for reporting corporate earnings were voluntarily adopted throughout industry, statements of the various companies would be more truly comparable. However, until accountants themselves have discussed and proposed solutions for the problem, possibilities for attainment of this goal are still remote.

Book Marks

ASTM Standards on Paint, Varnish, Lacquer, and Related Products. (American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pennsylvania, $2.75)

More than 160 specifications, tests, and definitions are contained in this fifth edition, a compilation of all the standards prepared through the efforts of ASTM Committee D-1. Among the subjects incorporated are pigments, drying oils, paint driers and thinners, shellac, varnish, etc.

ASTM Standards on Rubber Products (With Related Information). (American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pennsylvania, $3.25)

This 560-page volume, issued by the American Society for Testing Materials through the work of its Committee D-11 on Rubber, is a special compilation of those standard and tentative methods of test and specifications pertaining to rubber products. Included also as information only, are proposed specifications which are published in draft form for the purpose of soliciting comments and which have not been formally approved by the Society.

National Fire Codes—Vol IV: Extinguishing and Alarm Equipment. (National Fire Protection Association, 60 Batterymarch Street, Boston 10, Massachusetts, $3.00)

Increasing to 47 the standards for extinguishing and alarm equipment, this revised edition of Volume IV of the National Fire Codes deals with automatic sprinklers and water supply, fire extinguishers, carbon dioxide, foam and water spray extinguishing systems, municipal and rural fire apparatus, private fire brigades, watchman service, employee organization, and other related features of supervision and maintenance.

ASTM Elects New Officers

Carpenter, Goodrich Company, Is President; Templin, Aluminum Company of America, Is Vice President

OFFICERS for the coming year were elected by the American Society for Testing Materials at the Forty-ninth Annual Meeting in June. The new executive group is headed by Arthur W. Carpenter, manager of the testing laboratories of the B. F. Goodrich Company, who is the new president, and Richard L. Templin, assistant director of research and chief engineer of tests, Aluminum Company of America, who will serve as vice president.

The Board of Directors is composed of A. G. Ashcroft, director of research, Alexander Smith and Sons Carpet Company; A. T. Chameroy, manager of laboratory, Sears, Roebuck and Company; J. H. Foote, supervising engineer, Commonwealth & Southern Corporation; F. E. Richart, research professor of engineering materials, University of Illinois; and L. H. Winkler, metallurgical engineer, Bethlehem Steel Company, Inc.

Mr Carpenter has been with the B. F. Goodrich Company in his present position since 1928. Before this he was City Chemist in Alliance, Ohio; chemist of the Akron Municipal Water Purification Plant; and affiliated with both the Goodyear Tire and Rubber Company and the Holtite Manufacturing Company for a number of years. During the war he was for many months a consultant in the WPB Conservation Division.

Mr Templin joined the staff of the Aluminum Company of America after two years with the National Bureau of Standards. In 1934 he was awarded the ASTM Charles B. Dudley Medal for his paper on "The Fatigue Properties of Light Metals and Alloys".

Among the numerous activities of the Board members is a record of close association with the ASA. Mr Ashcroft is a representative on the Advisory Committee on Ultimate Consumer Goods and a member of the Sectional Committee on Fastness of Colored Textiles, L14, while Mr Chameroy represents the Mail Order Association of America in the Sectional Committee on Electric Water Heaters, C72. ASA Sectional Committee A1 on Specifications for Portland Cement includes Mr Richart among its members. Mr Winkler is on the ASA Standards Council and also active in the Sectional Committees on Wire Rope for Mines, M11, and Standardization of the Dimensions and Material of Wrought Iron and Wrought Steel Pipe and Tubing, B36. Mr Foote is a participant in the work of the Sectional Committees on Specifications for Copper Wire, H4; Insulated Wires and Cables (Other Than Telephone and Telegraph), C8; Power Switchgear, C37; Domestic Electric Flatirons, C70; Household Electric Ranges, C71; and Electric Water Heaters, C72.

Standards Planned for Aircraft Servicing Fittings

An important step toward simplifying operation and maintenance of international transport planes is the outgrowth of the recent eleventh National Aircraft Standards Committee meeting May 6 and 7 in New York, where the Aircraft Industries Association met with the Air Transport Association, Society of Automotive Engineers, CAA, the Army and Navy Aeronautical Board, British Air Commission, and the Royal Canadian Air Force.

At the May 6 meeting a program aimed at achieving American standardization of ground-to-aircraft servicing fittings was developed. This program will be taken up by the various manufacturers and the airlines, and subsequent meetings will be held to check on progress.

As an example of the importance of such a program, one of the things proposed was adoption by U. S. operators of under-wing fuel-loading connections. Since operators in other countries are interested in seeing such a connection internationally used, agreement on it over here would show the way for others. Much time and money could be saved at fueling stations if under-wing, pressure-loading connections were standard fittings. On most transport planes the gas hose must be hoisted on top of the wings, with resulting expense of time and occasional damage to wing surfaces. Because some planes load under the wings, a station must possess a variety of fuel-handling equipment to service all comers, or else some planes are delayed or turned away.

At the May 7 meeting, the standards group met with AIA's Engine Technical and Propeller Technical committees to develop viewpoints that would assist the Government's military procurement program through adoption of standard parts wherever practicable.

Hardacre President Of Illuminating Society

Gilbert K. Hardacre, manager commercial sales of the Public Service Company of Northern Illinois, has just been elected president of the Illuminating Engineering Society, according to an announcement by the Society. Mr Hardacre will take office as the 42nd president of the society at the annual convention to be held in Quebec September 18-20 and will serve for one year.

NBS Issues Mathematical Tables

Five additional mathematical tables, prepared by the Mathematical Tables Project of the National Bureau of Standards, have now been published. The following three are available from the Bureau in the form of reprints at 25 cents each:

MT34 Inverse interpolation for eight-, nine-, ten-, and eleven-point direct interpolation.

MT35 Table of coefficients for double quadrature without differences, for integrating second order differential equations.

MT36 Formulas for direct and inverse interpolation of a complex function tabulated along equidistant circular arcs.

Two others are available from the Columbia University Press, Box F483, 2960 Broadway, New York 27, N. Y. Their titles and prices are:

Table of arc x. $3.50

Tables of associated Legendre functions. $5.00

—New Standards in ASA Library—

For the information of ASA Members, the American Standards Association publishes a selected list of standards as they are received by the ASA Library. The list below includes only those standards received recently which the ASA believes are of greatest interest to Members.

These standards may be consulted by Members at the ASA Library, or copies may be obtained from the organization issuing the standard. The address of the organization is included for convenience in ordering.

Associations and Technical Societies

Society of Automotive Engineers, Inc (29 W. 39th St., New York 18, N. Y.)

A complete set of the specifications listed below may be obtained at 95¢

Aluminum Alloy Bars (Extruded) Copper Magnesium Manganese (24S-T), AMS 4152C

Aluminum Alloy Bars (Extruded) Magnesium Silicon Copper (61S-T), AMS 4150A

Aluminum Alloy Bars (Rolled) Copper Magnesium Manganese (24S-T), AMS 4120B

Cadmium Plating, AMS 2400E

Flux, Brazing (Silver), AMS 3410B

Gaskets: Oil Resisting (High Temperature), AMS 3232E

Identification of Natural and Synthetic Rubber Materials, AMS 2810A

Magnesium Alloy Bars (Extruded) AZ61X, AMS 4350B

Magnesium Alloy Forgings, AZ80X (Aged), AMS 4360A

Steel, High Carbon, AMS 5132A

Steel: Free Cutting, Manganese, AMS 5022C

Steel: Free Cutting, Manganese, AMS 5024B

Steel: Free Cutting, Manganese (Heat Treated), AMS 5025A

Steel Sheet and Strip, Spring-Annealed, AMS 5120A

Steel Tubing, Corrosion Resistant, High Pressure Hydraulic, 18 Chromium-8 Nickel, AMS 5566

Steel Wire, Corrosion Resistant, 18 Chromium-8 Nickel (Annealed), AMS 5685B

Synthetic Rubber and Cork Composition, General Purpose (35-45), AMS 3250A

Synthetic Rubber and Cork Composition, General Purpose (45-55), AMS 3251A

Synthetic Rubber and Cork Composition, General Purpose (55-65), AMS 3252A

Synthetic Rubber Sponge (Firm), AMS 3199C

Synthetic Rubber Sponge (Medium), AMS 3198C

Synthetic Rubber Sponge (Soft), AMS 3197C

Tolerances, Aluminum and Aluminum Alloy Bars, Rods and Shapes, Extruded, AMS 2205

The Tire and Rim Association, Inc (2001 First-Central Tower, Akron 8, Ohio)

Passenger Car Handbook, 1946, (Tire and Rim Standards Included), 50¢

U.S. Government

Wherever a price is indicated, the publication may be secured from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. In other cases, copies may be obtained from the government agency concerned.

Standards Branch (Room 6046, Procurement Division Building, 7th & D Streets, SW, Washington 25, D.C.)

Federal Specifications are prepared for use by all government departments and establishments in their purchases. Copies are available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at 5 cents each. Requests should be accompanied by cash, check, or money order.

As a service to Company Members, the ASA maintains a sale file of all Federal Specifications. These specifications can be purchased from the ASA Sales Department.

Federal Specifications

Hatchets, (Superseding Fed Spec GGG-H-131, and Emer Alt Fed Spec E-GGG-H-131), GGG-H-131a, March 1946

Ink, Stencil; Opaque, for Marking Non-Porous Surfaces (Metal, Glass, etc), TT-I-558, March 1946

Ink, Stencil; Opaque, for Marking Porous Surfaces (Wooden-Boxes, Fiber-Cartons, etc), TT-I-559, March 1946

Ladders (Extension, Sectional, and Straight): and Ladder-Shoes (Superseding Emer Alt Fed Spec E-LLL-L-51), (Amendment 1), LLL-L-51, May 1946

Markers; X-Ray Film, Lead Letters and Numerals, GG-M-125, March 1946

Pipe and Pipe-Fittings; Soil, Cast-Iron, (Superseding Amendment 1 and Emer Alt Fed Spec E-WW-P-401), (Amendment 2), WW-P-401, March 1946

Pipe-Fittings; Cast-Iron, Drainage, (Amendment 1), WW-P-491a, April 1946

Pipe-Fittings (Bushings, Plugs, and Lock-Nuts); Bronze and Ferrous (Screwed), WW-P-471, December 1945

Powder; Scouring (for) Floors, (Superseding P-P-591), P-P-591a, March 1946

Primer, Paint; Zinc Dust-Zinc Oxide (for Galvanized Zinc-Coated or Zinc Surfaces), (Superseding Amendment 1), (Amendment 2), TT-P-641, March 1946

Scales; Draftsmen's, GG-S-161, March 1946

Scales, Person-Weighing; High, Clinical (Physicians') Type, AAA-S-84, March 1946

Federal Specifications—Continued

Soap; Grit, Cake, (Superseding Amendment 3), (Amendment 4), P-S-571a, February 1946

Soap, Liquid and Paste; for Automobile, Floor, and General Cleaning, (Superseding Amendment 4), (Amendment 5), P-S-598, February 1946

Stockinet, Tubular (Cotton, Elastic, Washable), JJ-S-746, March 1946

Tubing; Electrical, Metallic, (Superseding Amendment 1), (Amendment 2), WW-T-806a, February 1946

Valves; Rubber, (Superseding Emer Alt Fed Spec E-ZZ-V-51a), (Amendment 1), ZZ-V-51a, March 1946

Valves, Bronze; Angle, Check and Globe, 125- and 150-Pound, Screwed and Flanged (for Land Use), (Superseding Fed Spec WW-V-51, and Emer Alt Fed Spec E-WW-V-51), WW-V-51a, March 1946

Valves, Bronze, Gate; 125- and 150-Pound, Screwed and Flanged (for Land Use), (Superseding Part of Fed Spec E-WW-V-76b, and Part of Emer Alt Fed Spec E-WW-V-76b), WW-V-54, March 1946

Varnish; Damar, (Superseding Amendment 1), (Amendment 2), TT-V-61, March 1946

Wire, Steel (Carbon); Bare and Zinc-Coated, (Amendment 1), QQ-W-461, February 1946

Zinc-Base Alloy; Die Castings, QQ-Z-363, April 1946

Treasury Department Procurement Division (Washington 25, D. C.)

Federal Standard Stock Catalog—Section IV, Part 1—Federal Specifications Index, Revised to February 1946, 30¢

U. S. Department of Agriculture Production & Marketing Administration (Washington 25, D. C.)

Canned Dried Prunes, March 1946

Fresh Freestone Peaches for Canning, April 1946

Frozen Peaches, Grades for (Tentative), June 1945

Frozen Sweet Cherries, Grades for (Tentative), June 1946

Green Olives, Grades of (Tentative), June 1946

Sweet Cherries for Canning or Freezing, June 1946

NBS Acts on Standards and Simplified Practice Recommendations

Simplified Practice Recommendations

Announced by the Division of Simplified Practice, National Bureau of Standards

Milk Shipping Cans, Proposed Revision of R208-45—

This is the first revision of R208-45, which became effective July 16, 1945. Originally applicable to roll-bottom, hoop-bottom, and solderless types of milk shipping cans of 5-, 8-, and 10-gallon capacity, dimensions, weights, and other details were also a part of the recommendation. Except for minor changes, these practices are retained.

The essential part of the revision is the addition of small milk cans of 4-, 8-, 10-, and 12-quart capacity. This represents the second step in the industry's general program of simplification of these products.

Open-End and Box Wrenches, R220-46—

The proposed simplified practice recommendation for open-end and box wrenches, identified as R220-46, has been approved for promulgation and is effective from April 15, 1946.

Valves, Automatic Regulating, R219-46—

Approval by industry of Simplified Practice Recommendation R216-46, for Automatic Regulating Valves, has been announced, effective from April 1, 1946.

Salt Packages, Proposed Revision of R70-42—

Now before the industry for acceptance is a proposed revision of Salt Packages, R70-42. First approved in 1927 and revised in 1941, it was altered again in 1942 to provide for changes in packaging practices because of the difficulties of obtaining burlap, the increasing shortages of cotton goods, and an anticipated shortage of paper products for packing. The number of primary package sizes was also reduced from 29 to 22.

The revision now proposed will eliminate two additional primary package sizes, barrels, and two-pound pockets. It also includes the use of paper bags for pockets, heretofore made exclusively of cotton; the use of primary containers made of cotton, burlap, or paper for certain kinds of salt; and bale covers for pockets, heretofore packed in cases only.

Carbon Steel Bars and Bar-Size Shapes, R222-46—

This recommendation has been approved for promulgation and is effective from June 30, 1946.

Files and Rasps (American Pattern, and Curved-Tooth Milled Files), R6-45—

Printed copies of this Simplified Practice Recommendation, which became effective May 1, 1945, are now available. The width and thickness dimensions of some of the sizes and types, which had been reduced during the war period as a conservation measure, have been restored in this edition. Several sizes of flat brass files and handsaw blunt files and one size of extra-slim taper files have been added. One size in each of six types is eliminated.

Paper Tubes and Holders for Milk Bottle Caps—

A proposed Simplified Practice Recommendation for Paper Tubes and Holders for Milk Bottle Caps has been submitted to the industries concerned for approval or comment. Its purpose is to ameliorate as far as possible the inconvenience experienced by dairies in fitting paper tubes (holding milk bottle caps) in the metal frames or holders on capping machinery. The proposal includes cap numbers and sizes of caps; inside diameter of tube and cap-clearance for each size of cap; outside diameter of tubes for each size of cap; tube-clearance in magazine of mechanical-capper; and tube-clearance in magazine of hand-capper.

Steel Rivets, R221-46—

This recommendation, effective from June 1, 1946, establishes a voluntary simplified list of recommended standard stock production sizes for small rivets having round head, flat head, truss or wagon box head, countersunk head, belt rivets, tinners' and coopers' rivets, and large rivets with buttonhead.

Bolts and Nuts, Revision of, R169-45—

Printed copies of this revision are now available. The recommendation establishes a simplified list of stock-production sizes for milled studs, square-head and hexagon-head machine bolts, square-neck carriage bolts, square-head lag bolts, square-neck step bolts, elevator bolts, tire bolts, as well as regular, heavy, light, machine-screw, and stove-bolt nuts.

Commercial Standards

Announced by the Division of Trade Standards, National Bureau of Standards

Men's Pajama Sizes (Third Edition), CS15-46—

Size designations, methods of measuring, and standard minimum measurements for men's pajamas, whether made from shrunk or unshrunk fabrics, come under the scope of this standard. This is a revision of CS(E)15-43 in order to change the sizes A, B, C, and D in this war emergency standard back to the peacetime sizes as standardized in the earlier edition, Commercial Standard CS15-29, and to retain size E in the permanent standard. The standard is effective for new production from July 20, 1946. In order to assure the consumer that he is receiving garments that comply with standard minimum measurements, the standard recommends that a sticker be used to identify garments made according to the standard measurements.

Woven Wire Netting, CS133-46—

This standard covers materials, workmanship, and dimensional requirements for various types and kinds of galvanized carbon steel woven wire netting ordinarily employed for poultry runs and pens, domestic animal pens, fur-bearing animal pens, crab traps, and stucco (exterior plaster) reinforcement. These commodities are sometimes colloquially known as "chicken wire", "fox pen netting", "tennis court netting", "stucco mess", etc. This does not include welded mesh or fabric of any description, nor does it cover "farm" or "field" fencing. The standard is effective for production from June 1, 1946.

Color Materials for Art Education in Schools, CS130-46—

The purpose of this Commercial Standard is to provide a guide for the use of school authorities in the purchase of color materials for art education in schools. It is expected to help in determining satisfactory color, working properties, and durability; aid in eliminating confusion in nomenclature. It is also expected to provide criteria for differentiation among materials of known satisfactory composition and others considered unsuitable for art education in schools, and thus to provide a basis for certification of quality. It covers material and workmanship, working qualities, color, packing, and quality guarantees and is effective for new production from January 1, 1946.

News from other countries

Russia Joins United Nations Standards Coordinating Committee

THE All-Union Committee on Standards of the USSR has applied for membership in the United Nations Standards Coordinating Committee and has been welcomed by the Executive Committee Chairman, James G. Morrow of Canada, according to an announcement by H. J. Wollner, secretary-in-charge of the New York Office of UNSCC. With the addition of the Soviet national standards body, the membership of the UNSCC now includes the national standards bodies of 18 countries, as follows:

Australia	Mexico
Brazil	Netherlands
Belgium	New Zealand
Canada	Norway
Chile	Poland
China	South Africa
Czechoslovakia	United States of America
Denmark	Union of Soviet Socialist Republics
England	
France	

The United Nations Standards Coordinating Committee grew out of conferences held between the national standards bodies of Canada, the United States, and Great Britain in the later stages of World War II and has expanded to include the national standards bodies of the other United Nations as these applied for membership. It is active in coordinating national industrial standards and in planning a broad permanent peacetime program of collaboration between nations.

The UNSCC held a conference in New York last October at which discussion was largely devoted to the drafting of a constitution for a new permanent international standards organization. The draft constitution is now being examined by the national member bodies who will further discuss it at a conference which is planned for October 1946. This conference will be held in London.

Recently, the American Standards Association submitted to the UNSCC a large program for international standardization in the field of textiles. Ninety-four test methods covering the entire range of textile testing were submitted, with the suggestion that the other national standards bodies which are members of the UNSCC examine these standards to determine whether they might form the basis for international discussion and eventual coordination and adoption. This program has been transmitted to the other members and it is now under their consideration.

Other projects previously proposed and now in process of study are metal food containers; moisture regain of wool; definition of the term rayon; manganese ore test methods; Safrol oil test methods; terms and definitions relating to the heat treatment of steel; plastics terminology; radio interference suppression; airfield lighting; identification, colors and marks, filling ratios, and valve outlets for gas cylinders; simplification of shellac grades, and methods of testing the properties of shellac; standard for sheet and wire gages; standard voltages above 220 kv; machine tools; unification of boiler construction codes; automobile standards; building standards; documentation.

The admission of Russia to the membership of the UNSCC will greatly strengthen the activities of the Committee, which now includes all of the large industrial powers of the world, Mr Wollner declares.

Canadian Standards Association Plans Welding Approval Service

A NEW development in certification of quality has been announced by the Canadian Standards Association, which is now making plans to extend its approval service to cover welders and welding organizations. For six years the Association has successfully carried on an approval service covering safety of electrical equipment and appliances, granting approval on the basis of tests made under the requirements of the Canadian Electrical Code. Manufacturers, inspection authorities, and consumers throughout Canada are now accepting as normal routine the procedure of the CSA as applied to electrical devices, the Association reports.

Now, at the request of the steel industry, the Association is taking steps to set up a Welding Bureau to study the qualifications of welders and welding organizations and to issue certificates of approval for all those which meet the qualification requirements. This will be determined on the basis of the Canadian

Standard Welding Qualification Code, S 47. It is planned that the bureau's experts will visit all interested plants to explain the codes and specifications, to conduct tests and inquiries concerning the qualification of the plants and operators, and to issue certificates stating that such plants are adequately staffed, and experienced to do welded work of a particular class. Qualified plants will be listed, and those lists will be made available to interested parties.

Such a bureau is needed, the groups concerned believe, because the process of electric arc-welding has a continually widening application and an almost illimitable future. Manufacturers are anxious to produce first class work and can do a good job when materials, plant, welders, and supervision are properly selected and efficiently controlled, the Association explains.

"The nature of the proposed bureau is perhaps best described as a mutual protection and insurance scheme," the Canadian Standards Association explains, "whereby the aggregate experience of all welding firms will be continuously translated into an educative and qualifying code for the benefit of all. A code has already been established by a competent representative body, viz, the CSA, and is already in use, and a system of continuous inspection and certification will be maintained so that all concerned, whether private purchasers, public authorities, or responsible engineers may be assured that the welding work done by firms so certificated is adequate, uniform, safe and suitable for whatever duty it is designed to perform.

"The objective is manifestly to encourage and maintain a high degree of workmanship, skill, and reliability, to develop the best methods, to circulate experience, and to convince reluctant potential customers that welding can be safely adopted when expertly executed and suitably controlled."

British Develop Standards for Cooker Parts

Standards for cooker parts which will allow a high degree of interchangeability have been drawn up by the British Electrical Development Association, announcements from London indicate. Authorities are now being urged to cooperate in securing their general adoption by requiring standardized boiling plates and other wearing parts in all postwar designs.

Electrical Trading, London, reports that, in issuing its cooker specifications, the EDA pointed out that some progress towards standardization had already been made, since the "V" cooker, designed for Ministry of Works temporary houses, complies with its provisions.

Australia Drafts Manual of Gauging Practice

A Manual of Gauging Practice has already progressed through the procedure of the Australian Standards Association to the point where draft sections have been circulated for critical examination and review and have now been adopted by the Coordinating Committee. The draft sections which have reached this near-final stage cover:

Interchangeable manufacture
Systems of limits and fits
Control by use of limit gauges
Taper plug and ring gauges
Storage, issue, and use of gauges

Other drafts have been circulated for comment but have not yet been revised for consideration by the Coordinating Committee.

A project on the same subject undertaken under the War Procedure of the American Standards Association resulted in publication of a technical report. An American War Standard was not completed, however, because it was impossible to obtain agreement of the principal groups concerned.

British Clothing Makers Consider Style Standards

"What is one man's meat is another man's poison"; what is one manufacturer's mess jacket might be another manufacturer's military jacket.

Facetious though it may sound, the latter quotation is causing many headaches for the Overall Manufacturers Association of Great Britain. At the annual meeting held in Manchester, the newly elected chairman stressed the need for a recognized standard of styles and urged the cooperation of manufacturers in helping to compile a reference guide to style terminology.

British Consider Standards For Agricultural Machinery

The need for standardization of agricultural machinery and implements is being investigated by the British Standards Institution in response to numerous complaints from members representing rural areas. In the *Belfast News Letter*, the Minister of Agriculture is reported to have announced that British manufacturers are giving priority to production of spare parts. This was in reply to accounts concerning the lack of spare parts available. He declared that he was not aware of any general shortage of parts for home-produced machines but admitted that there had been difficulty in procuring spare parts for American machinery. All possible steps will be taken to expedite shipment.

British to Certify Standard Plastics

A certification plan which will be applicable to plastics materials and to products made from plastics has been agreed upon by the Mark Committee of the British Standards Institution in collaboration with the British Plastics Federation. This mark may be used by manufacturers of plastics products and materials to certify that their articles conform with the relevant British Standard specifications.

A series of specifications for specific articles will be issued in due course but it has been agreed that it will not be practical to prepare individual specifications for every type of article that can be made in plastics. In the case of moldings, for example, a general definition for "technical moldings" has been compiled which sets the minimum requirements to be complied with in order to qualify for the BSI Certification Mark. It has been published as BS1253:1945.

Standardization of cinema seat fittings is to be recommended by the British Standards Institution, an item in the London *Kinematograph Weekly* indicates. Representatives from the principal districts of the country have been requested to attend a conference which has been called to discuss the subject.

ASA Standards Activities

American Standards

Standards Being Considered by ASA for Approval

Bedding and Upholstery
Sponsor: National Association of Bedding and Upholstery Law Enforcement Officials
Definitions (Including Tolerances) for Cotton Filling Materials for Bedding and Upholstery, L12.1
Definitions (Including Tolerances) for Wool Filling Materials for Bedding and Upholstery, L12.2
Definitions for Miscellaneous Filling Materials for Bedding and Upholstery, L12.4

Construction and Maintenance of Ladders and Stairs for Mines, M12.1 (Revision of American Tentative Standard on Construction and Maintenance of Ladders and Stairs for Mines, M12-1928)
Sponsor: American Mining Congress

Motion Picture Photography
Sponsor: Society of Motion Picture Engineers
Theater Projection Rooms (Revision of American Recommended Practice, Z22.28-1941, to be designated as Proposed American Standard Dimensions for Motion Picture Theater Projection Rooms, Z22.28)
Theater Projection Screens (Revision of American Recommended Practice, Z22.29-1941, to be designated as Proposed American Standard Dimensions for Motion Picture Theater Projection Screens, Z22.29)
Safety Film (Revision of Recommended Practice Z22.31-1941, to be designated as Proposed American Standard Definition for Motion Picture Safety Film, Z22.31)

Still Photography
Sponsor: Optical Society of America
Dimensions for 35-Millimeter Film Magazines for Still Picture Cameras, Z38.1.47
Reels for Processed Microfilm, Z38.7.17
Specifications for Microfilm Readers, Z38.7.9
Specifications for 35-Millimeter Slidefilm Projection Rolls, Z38.3.3

Standards Submitted to ASA for Approval

Allowable Concentration of Trichloroethylene
Endorsing Sponsor: American Industrial Hygiene Association

Specifications for Gypsum Plastering, A42.1 (Revision of American Standard Specifications for Gypsum Plastering, A42.1-1942)
Sponsors: American Institute of Architects; American Society for Testing Materials

New Projects Being Considered

Identification and Cataloging of Antifriction Bearings
Standards for Home and Farm Freezers
Standards for a State Electrical Inspection Law and Municipal Electrical Inspection Ordinance

American War Standards

War Standards Under Way

Radio Noise, Methods of Measuring, C63
Interference Measurement, Radio, Methods of,
150 Kilocycles to 20 Megacycles (for Components and Complete Assemblies) (JAN-I-225)

Screw Threads, B1
Buttress Threads
High-Duty Studs in Light Alloys
Instrument Threads
Stub Acme Threads
Unification of Screw Threads

Women's Industrial Clothing, L17
Jackets for Outdoor Wear (Slide Fastener Closure), L17.6
Jackets for Outdoor Wear (Fly-Type Button Closure), L17.5

Wood Poles, O5
Ultimate Fiber Stresses of Wood Poles, O5aWS

News About ASA Projects

Fire Protection and Fire Resistance, A51—

Sponsors: National Board of Fire Underwriters; National Fire Protection Association; National Bureau of Standards, U. S. Department of Commerce

The Sectional Committee on Building Code Requirements for Fire Protection and Fire Resistance and its subcommittees met in Washington in June to discuss the status of this project thus far. In order to speed completion of the work on this important phase of the building code requirements, a series of meetings of the subcommittees and the sectional committee is planned for the week of October 14, at which time it is hoped that final action can be taken.

Excavations and Foundations, A56—

Sponsor: American Society of Civil Engineers

A third draft of the Proposed American Standard Building Code Requirements for Excavations and Foundations, A56.1, is now being circulated through letter ballot to members of this ASA sectional committee.

Insulated Wires and Cables, C8—

Sponsor: Electrical Standards Committee

The future activities of this committee were discussed in detail at a meeting on June 12. It was concluded that wherever practicable, standards for complete assemblies rather than for component parts would be prepared and that the organization of subcommittees would be revised

Insulated Wires and Cables

as necessary to prepare these complete standards.

An advisory group was set up to review and make recommendations to the sectional committee on the scope and personnel of subcommittees.

Power Switchgear, C37—

Sponsor: Electrical Standards Committee

A news letter which calls attention to the present status of the various standardization projects that fall within the assigned scope of the ASA Sectional Committee on Power Switchgear, C37, has been circulated to all members of this committee. George Sutherland, Consolidated Edison Company, the new sectional committee chairman, has instituted this practice as a method of greeting his members, while, at the same time, informing them of the work of their committee as it now stands. Usually this summing up occurs only in the form of an annual report.

In his communication, Mr Sutherland announced that several subcommittees have been discontinued. "Only those required for active projects, or those whose assignments parallel subjects in which there is continuing activity in other committees that will ultimately lead to standards subsequently to be referred to us for action, are being continued," he stated.

Those which have been suspended are the committees on bushings, scope, definitions, and insulation electrical tests.

A resume of the status of those projects which are still operative follows:

Air Switch and Fuse Subcommittee (C37.3)

"It is understood that AIEE standard 22 of June 1942 is being revised by an Institute working group. In January 1945, NEMA publication 45-94 appeared, including air switches. In November 1942 a draft of a proposed American Standard for Air Switches (C37.3) was circulated among the members of our corresponding subcommittee but would of course require revision to incorporate the material covered by later AIEE and NEMA standardizing work. It is expected that the American Institute of Electrical Engineers will eventually submit a proposed standard for ASA consideration.

"As in the case of our other active subcommittees, some changes in personnel have been made in order to include overlapping personnel with that of other working committees concerned with the same general subject, notably with AIEE working groups. This will prevent duplication of discussions on details and insure more efficient operation.

Large Air Circuit Breaker Subcommittee (C37.11)

"Certain air circuit breakers, notably all a-c air circuit breakers rated in excess of 600 volts, are already covered by American Standards C37.4 through 9, 1945. This still leaves all d-c air circuit breakers and all low voltage a-c circuit breakers (larger than sizes covered by the National Electrical Code, which is handled by another sectional committee, C1), to be covered by

an American Standard. It is understood that an AIEE committee is now working on the revision of AIEE Standard 20 of 1930. Upon the completion of their work, it will presumably be referred to this sectional committee for study and approval as an American Standard. NEMA publication 46-109 of February 1946 ("Large Air Circuit Breakers") undoubtedly contains considerable material that would properly belong in an American Standard on this subject, though not of such nature as could have been included in an AIEE standard. It appears, therefore, that there will soon be work for our subcommittee on this subject.

Power Circuit Breaker Subcommittee (37.4 through 9)

"American Standards for Alternating Current Power Circuit Breakers, C37.4 through 9, were issued in 1945 and there is no work assigned to this subcommittee at the present time. However, the Triple Joint Committee on Power Circuit Breakers is working on a further simplification of the schedule of Preferred Ratings (C37.6) and certain other deferred items that will eventually find their way into the standards, so that there may be some activity for this subcommittee next year.

Relay Subcommittee (C37.1)

"An AIEE Protective Devices Committee working group is at present engaged in preparing a proposed revision of the American Standard, C37.1-1937, which was the first standard produced by our sectional committee. As the results of the work of the AIEE committee will automatically be referred to us upon completion, I have appointed a subcommittee of this sectional committee to review this AIEE proposal before it is submitted to the main sectional committee for letter ballot. Due to the overlapping membership of our subcommittee and of the AIEE working group, close cooperation is assured and the chances of prompt approval by our sectional committee are improved."

A letter ballot was also attached to Mr Sutherland's news letter for the convenience of members in recording any suggestions for new subjects that they felt might be added to the official scope.

Numbering System for Anti-Friction Bearings—

At an industry conference called by the American Standards Association, representatives of interested industries, the Army, the Navy, and other government groups concerned, unanimously recommended that the ASA should organize a project to consider the establishment of an American Standard Numbering System for Ball and Roller Bearings.

Consideration of this problem resulted from a request made by Secretary of the Navy Forrestal to the ASA, in which he declared that much difficulty and wasted effort during the war would have been avoided had there been a generally adopted numbering system to identify anti-friction bearings. With his request, Mr Forrestal submitted a numbering system developed by the Navy Department which has also been adopted by the War Department.

The industry conference was called to determine whether the interested industrial and governmental groups would favor the approval of the Army-Navy Numbering System as an American Standard acceptable to industry and the Government alike.

The general conference unanimously decided that it would be desirable to establish a uniform numbering code but that it would be necessary to give this problem further consideration. It also agreed that the subject could best be handled by a technical committee organized under ASA procedure. Existing numbering systems, such as the one adopted by the Army and the Navy, and the code developed by the bearing manufacturers could then be taken as a basis for the work of such a committee.

Standards for Electrical Lamps, C78—

Sponsor: Electrical Standards Committee

At a meeting of Subcommittee 2, it was recommended that various samples of electric discharge lamps should be forwarded to the National Bureau of Standards for color measurement.

Dimensional and electrical characteristics of electric discharge lamps were discussed in detail and standard dimensions were set down for general service fluorescent lamps. Standard voltage and lamp current values were reached for some lamps while data on the remaining lamps is being withheld pending receipt of results from interlaboratory measurements.

The question of interchangeability of multiple-operated cold cathode lamps was discussed and referred to a subgroup for further study.

Power Presses and Foot and Hand Presses, B11—

Sponsor: National Safety Council

At a recent meeting of this sectional committee, steps were taken to prepare a future revision of the 1937 safety code. Since the committee has not met in nine years, consideration was given to comments concerning the code which have been received in the ASA offices during that time.

Protection of Heads, Eyes, and Respiratory Organs, Z2—

Sponsor: National Bureau of Standards

A recommendation has been made by Sectional Committee Z2 for triple sponsorship for this project. In a letter to the Safety Code Correlating Committee, it was requested that permission be granted to invite the Navy Department and the U. S. Bureau of Mines to join with the National Bureau of Standards in sponsoring a safety code for the protection of heads, eyes, and respiratory organs.

At its executive committee meeting, the SCCC recommended acceptance of this request. The proposal is now being circulated through letter ballot to the SCCC members.

Drawing and Drafting Room Practice, Z14—

Sponsors: American Society of Mechanical Engineers; Society for Promotion of Engineering Education

The work of the War Committee on Manual of Standard Drawing Practice, Z14, has been discontinued. The Joint Army-Navy Committee on Standard Drawing Practice has now decided to limit present activity to bringing about standardization of their own drawing practices, followed by submission of their approved standards to the ASA for processing under normal peacetime procedures. This modified plan has been approved by the Army-Navy Joint Specifications Board.

Upon submission to the ASA of the approved Joint Army-Navy standards, they will be turned over to the Sectional Committee on Drawings and Drafting Room Practice, Z14, for consideration in subsequent revisions of the American Standard Drawings and Drafting Room Practice, Z14.1-1946.

Industrial Use of X-Rays, Z54—

Information on problems arising in the use of the Safety Code for the Industrial Use of X-Rays, Z54.1-1946, may be obtained from a new Committee on Interpretation and Application which has been appointed for that purpose. Members of the committee are:

Lauriston S. Taylor, Chief, X-Ray Section, National Bureau of Standards, *Chairman*
E. C. Barnes, Industrial Hygiene Engineer, Westinghouse Electric Corporation
R. P. Blake, Senior Safety Engineer, Division of Labor Standards, U. S. Department of Labor
C. B. Braestrup, Senior Physicist, New York City Department of Hospitals
Dr E. E. Charlton, X-Ray Section, General Electric Company
Dr G. Failla, Director, Radiological Research Laboratory, Department of Radiology, Columbia University
Dr Albert S. Gray, Director, Bureau of Industrial Hygiene, Connecticut State Department of Health
Dr R. R. Newell, Department of Roentgenology & Radium Therapy, Stanford University School of Medicine
George Singer, X-Ray Section, National Bureau of Standards
Dr Scott W. Smith, Physicist, The Kelley-Koett Manufacturing Company

The Executive Committee of the Safety Code Correlating Committee at its meeting on June 21 recommended that the scope of the present ASA War Committee on Industrial Use of X-Rays, Z54, be referred to the Standards Council for approval as the scope for the peacetime sectional committee when it is organized.

Safety Code Correlating Committee—

The American Society for Testing Materials has requested and been accorded representation on the Safety Code Correlating Committee. The Society's request was made because materials standards have become increasingly important in development of safety codes and other safety standards.

Standardization of Office Equipment—

As the result of an informal conference held in June, it was decided to call a formal conference to consider the proposal of the National Office Management Association for the establishment of a project on standardization of office furniture, equipment, forms, and records.

Now Available

The latest approved standard in the series of American Standard Building Code Requirements

Building Code Requirements for Light and Ventilation, A53.1-1946 .45

Outlines requirements for window space to provide adequate natural light and ventilation in buildings now under construction —for use by building officials, architects, contractors.

Other American Standard Building Code Requirements approved and in print:

Fire Tests of Building Construction and Materials (ASTM C19-41; ASA A2.1-1942)	.25
Methods of Test of Door Assemblies (ASTM C152-41; ASA A2.2-1942)	.25
Building Exits Code (A9.1-1942)	$1.00
Building Code Requirements for Masonry (A41.1-1944)	.50
Administrative Requirements for Building Codes (A55.1-1944)	.35
Building Code Requirements for Structural Steel (Riveted, Bolted, or Welded Construction) (A57.1-1943)	.40
Building Code Requirements for Minimum Design Loads in Buildings and Other Constructions (A58.1-1945)	.50
Building Code Requirements for Reinforced Gypsum Concrete (A59.1-1945)	.25
Portable Steel and Wood Grandstands (Z20.1-1941)	.60

American Standards Association

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